√EM-1 Automatic Train Stop

Ansaldo STS USA Part Numbers
N387658002
N387658004
N387658006*
N387658003
N387658007
N4518010101
N387658
N388403
N436240 (Obsolete)
N387658009

* Trip Stop N387658006 replaced by Trip Stop N387658003.

- ♦ Description
- ♦ Installation
- ♦ Maintenance

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Revision History

Rev.	Date	Nature of Revision
Original	January 1983	Original Issue
*	March 1988	
*	July 1991	
*	September 1997	
*	February 1999	
5	January 2006	Incorporate ECO EM-2394; incorporated a minimum wipe on contactors for trip arm installation. Incorporate ECO 139712-363; specify grease for lubricating main shaft bearings.
6	March 2007	Incorporate ECO 140220-8; Revised the terminal designations on the terminal boards shown in Figure 4-3 for Train Stop N388403.
7	November 2007	Incorporate remaining portions of ECO 140220-8A; Added circuit controller part number to Table 4-5, included two figures, and made other editorial changes to document. Incorporate ECO 140250-2; Added N387658009 to manual and supporting parts list and figures. Incorporate EM-2726; Modified trip stop parts lists to reflect various component changes. Incorporate Engineering part number changes in Items 46 and 76 in Table 4-6.
8	February 2009	Revised Table 4-3 for part number N387658004 per ECO U-2535A.

* Revision numbers were not assigned when these revisions were made.

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1. GENERAL INFORMATION

1.1. Introduction

The train stop is used in conjunction with wayside signals in subway and urban transportation systems to ensure observance of, and compliance with, restrictive indications. Failure to comply with the rules regarding such indications results in stopping the train. Operation is completely automatic and entirely independent of any action on the part of the motorman.

The system functions by means of mechanical contact between a wayside trip arm and a brake emergency trip switch or trip cock which is mounted on the car. The wayside trip arm is lowered when the signal is clear and raised when the signal is at stop. If a train tries to pass a signal at stop, the wayside arm will engage the cars brake emergency trip switch or trip cock, thereby initiating an emergency brake application.

1.2. General Description

The trip stop mechanism (Figure 1-1) is housed in a cast-iron case and consists of a combined motor and gear case, circuit breaker with driving arm, compression return spring, and sector. The trip arm assembly consists of a trip arm, rocker shaft, bearing strap with self-aligning bearing, and a hold-down hook.

The trip arm is driven under power to the clear position (1/2" below the top of the running rail). It is returned to the stop position above the running rail by a compression return spring.

The Train Stop Circuit Controller is mounted next to the trip arm. Its function is to indicate the position of the trip arm.

1.2.1. Operation

The automatic train stop mechanism is powered by a gear head, induction type motor and operates on 110 volts, 60 Hz AC.

A running capacitor connected in series with one winding produces the necessary phase shift for starting and driving the motor. When drive-down is completed, the motor operating contact of the circuit controller is opened. A holding capacitor and a 5-ohm, 10-watt resistor are inserted in series with the common leg of the motor. The additional capacitance and resistance control the input of the motor to a point where the motor produces sufficient stalled torque to hold the trip arm in the clear position.

When the energy is removed from the motor, the action of the return spring causes the trip arm to assume the stop position automatically.

1.3. Operating Characteristics

	In Rush	Holding
Current at Normal Voltage (approx.)	1.42 Amps	0.73 Amp

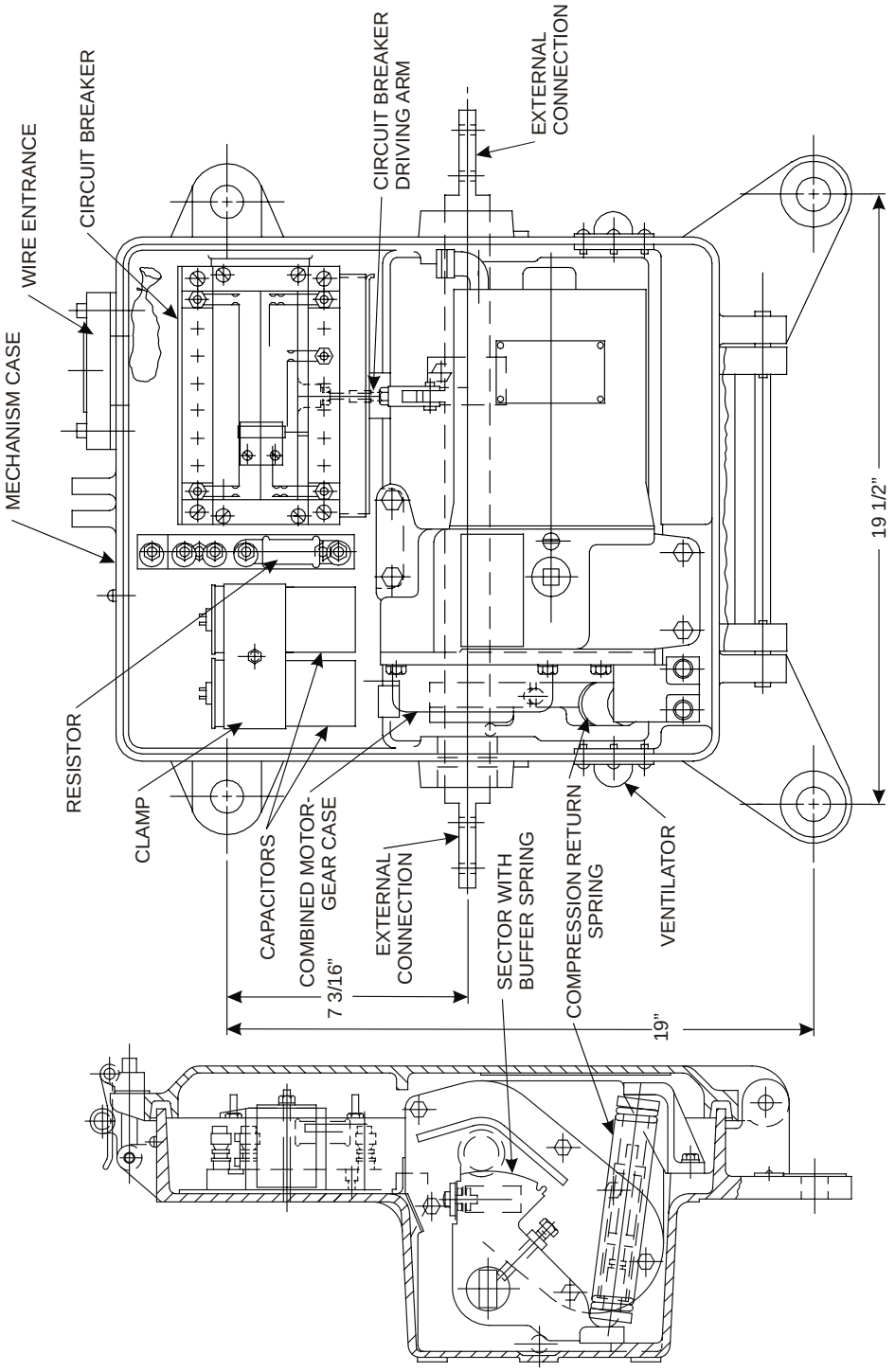


Figure 1-1. Style EM-1 AC Automatic Train Stop Showing Cover Off and with Mechanism in Stop Position

2. INSTALLATION

Figure 2-1 illustrates a typical mounting. However, the design of the unit is such that the mounting can be varied according to railroad requirements, including installation on elevated structures and ballasted ties. To install, proceed as follows:

1. Set mechanism case on mounting plates midway between rails.

2. Fasten rocker shaft to operating shaft for right-hand or left-hand operation, as required.

3. Slide bearing strap on ties, inserting rocker shaft in outer bearing. Position bearing strap on ties at Distance B from gauge side of running rail.

4. Shim bearing and mechanism case, if required, for proper vertical and horizontal alignment of rocker shaft.

5. Clamp trip arm to rocker shaft so that the Distance A agrees with your railroad's requirements.

6. With trip arm in stop position (Figure 2-2), shim as required to raise arm approximately 1/8-inch above Distance C, the distance specified by your railroad.

7. Turn adjusting screw to adjust trip arm down to Distance C and secure with lock nut. This adjustment prevents impacts on trip arm from being transmitted to stop mechanism.

8. Secure mechanism and bearing strap to ties.

9. Connect field wiring in accordance with railroad plans. Internal wiring is shown in Figure 4-2 through Figure 4-7. Be absolutely sure that the wiring does not interfere with moving parts or contacts.

10. When installing a hold down hook, verify that when the trip arm is held down by the hook, the contact spring buttons have a minimum wipe of 1/64" on the flats of the knife blade contactors.

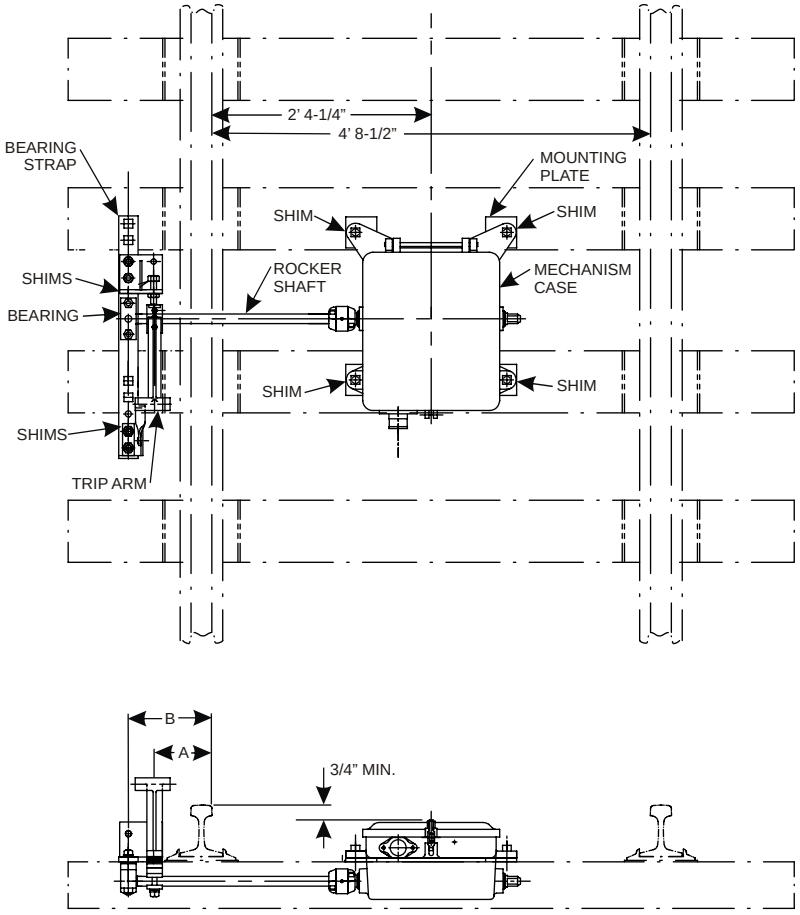


Figure 2-1. Typical Train Stop Layout

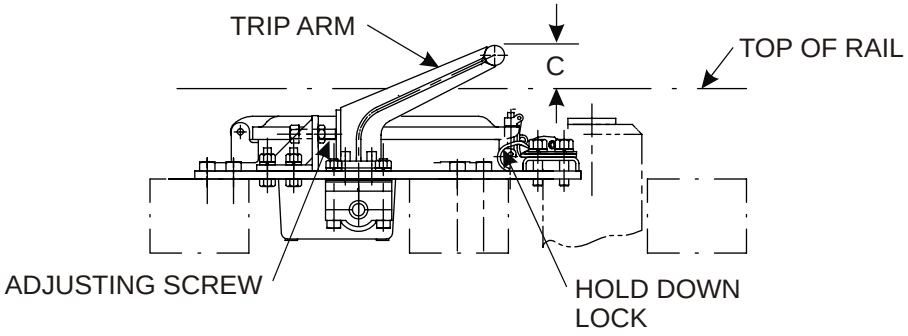


Figure 2-2. Trip Arm Adjustment

3. MAINTENANCE

3.1. Train Stop Maintenance

Proper operation of the train stop depends, to a great extent, upon good lubrication and maintenance. The required frequency of lubrication depends on the frequency of operation and, to some extent, on local conditions, such as extremes of temperature, etc. Make regular inspections and establish a maintenance schedule based on your findings.

3.2. Mechanical Inspection

1. Check that the trip arm is fastened securely to the rocker shaft.

2. Check the distance from the center of the trip arm to the gauge side of the running rail (Distance A, Figure 2-1) to determine that the mechanism is not moving or loose.

3. Gears must run freely and show no tendency to bind in any position.

4. Inspect the circuit controller for freedom of moving parts. There must be no tendency to bind in any position. Inspect condition of contacts and clean, if necessary. Nibs on contact fingers should have approximately 1/16" opening. Adjust if necessary. This adjustment permits a reasonably flat contact when the movable arm contact enters the nibs on the contact finger.

5. Occasionally clean the ventilator screens and replace, if necessary.

3.3. Lubrication

1. Each mechanism is shipped from the factory with a pint can of Texaco Type A Transmatic Transmission fluid inside it. This fluid is to be applied inside the gear case at the initial installation of the mechanism. It is necessary to remove the 1" pipe plug (Item 34, Figure 4-17) to apply the fluid. Occasionally check and add sufficient fluid to keep its level 1-1/2" above the bottom of the case. A pint can of the fluid may be obtained from US&S by ordering reference N392153. After adding the fluid, seal the threads of the fill plug with Permatex™ Ultra Blue Sealant or equivalent (Permatex™ Item Number 81724 or US&S Part Number J041248).

2. Lubricate the two mechanism main shaft bearings and the tripper arm bearing with a pressure grease gun using a quality automotive multi-purpose grease. It is important to apply the grease until a surplus is visible at both ends of the bearings. This can be done by placing a rag tight against the side where grease is flowing through, thereby forcing the grease to the other side.

3. Apply medium body motor oil (SAE 30) to the circuit controller slides and linkage pin.

4. The motor has pre-lubricated sealed bearings. No lubrication is necessary on these bearings.

3.4. Gear Motor Seals

The following gaskets must be formed from LocTite™ Master Gasket Compound (US&S Part No. J041249):

1. Gasket between the gear box and the gear box cover
2. Gasket between the gear box and the motor

LocTite™ Master Gasket Compound is a two-part compound consisting of a sealant and a primer.

NOTE

All surfaces must be clean, dry, and free of grease or oil

1. Apply a 1/8” bead of sealant to the motor mounting face, encircling the bolt holes.
2. Spray the primer on the mating surface of the gear box.
3. Allow the primer to dry for two minutes.
4. Assemble the gear box to the motor.
5. Apply a 1/8” bead of sealant to the gear box, encircling the bolt holes.
6. Spray the primer on the cover.
7. Allow the primer to dry for two minutes.
8. Assemble the cover to the gear box.
9. Apply LocTite™ Threadlocker 242 (US&S Part No. J041245) to the threads of the cover screws prior to assembly.
10. Tighten the cover screws to 200 inch-pounds.
11. Allow the LocTite™ Threadlocker to cure for 24 hours before adding fluid to the gear box.
12. After the LocTite™ has cured, add one pint of Texaco Type A Transmatic Transmission Fluid, (Spec. M-7616-03, US&S Part No. N392153) to the gear box.
13. Seal the threads of the fill plug with Permatex™ Ultra Blue Sealant or equivalent (Permatex™ Item No. 81724 or US&S Part No. J041248).

4. PARTS LISTS AND WIRING DIAGRAMS

Table 4-1 presents general information on the EM-1 Train Stop. Table 4-2 shows a typical parts list for the train stop layout.

Table 4-1. EM-1 Train Stop General Information

Part Number	Capacitor Combination	Coupling Diagram (Figure 4-1)	Switch Heater
N387658	20 µF - 25 µF *	A(RH)	No
N387658002	20 µF - 20 µF *	A (LH)	No
N387658004	15 µF - 20 µF	B	No
N387658003	15 µF - 20 µF	B	Yes
N387658007	20 µF+ 5 µF	B	No
N388403	20 µF - 25 µF **	A (RH)	Yes
N436240 (2)	35 µF - 50 µF	B	No
N4518010101	20 µF - 20 µF	B	Yes
N387658009	20 µF - 25 µF	B	Yes

* Were 14 µF - 18 µF on earlier models

** The 25 Hz EM-1 Train Stop has a two-post terminal board

Table 4-2. Typical EM-1 Electric Train Stop Layout Parts List

Item	Description	Part Number
1	Bearing	N387726
2	Hook	N399564
3	Tripper Arm	N398410
4	Tripper Arm	N435973
5	Shaft	----------

NOTE

Due to the wide variety of train stop layouts, it is impractical to list all shafts and other variable parts and hardware. For ordering parts external to the mechanism case, refer to the prints used for installation of the particular EM-1 Train Stop.

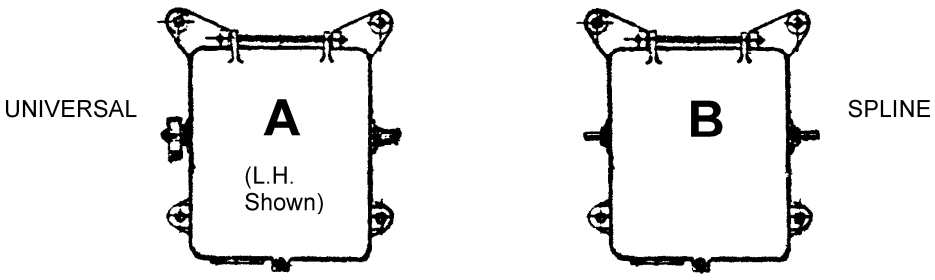


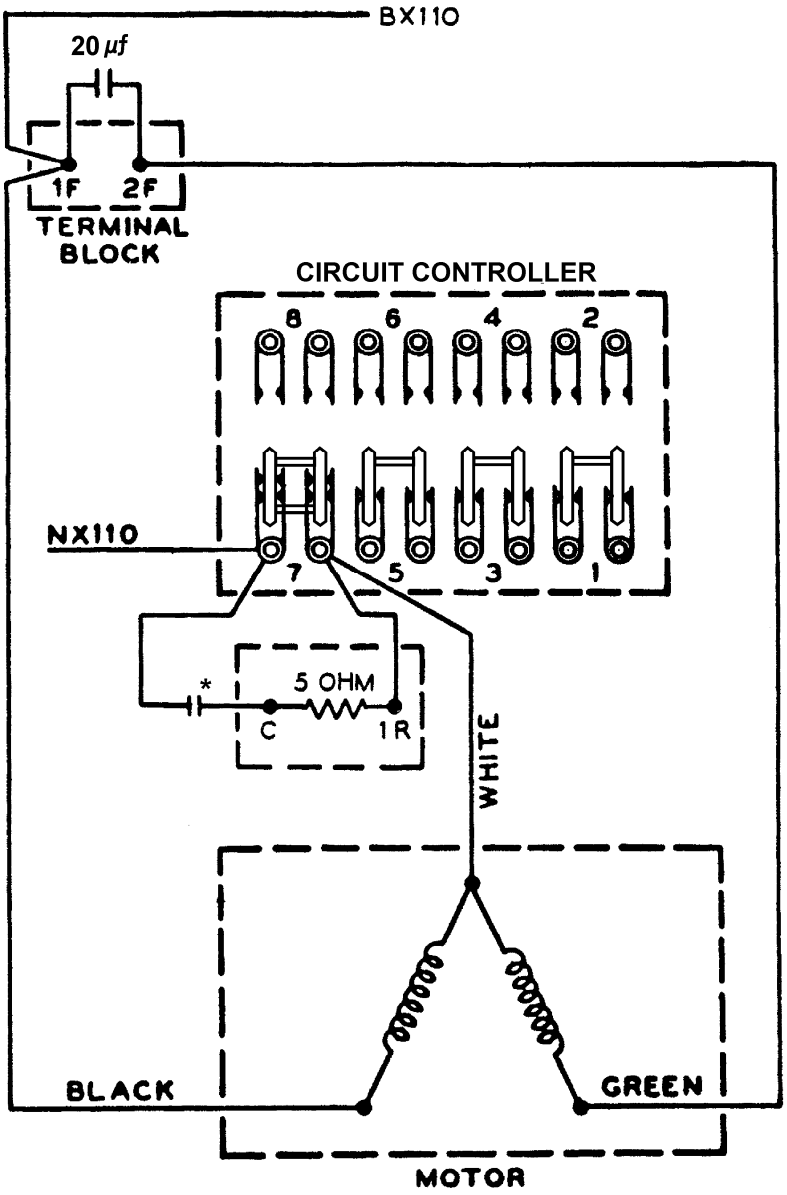
Figure 4-1. Coupling Diagram

4.1. Wiring Diagrams

4.1.1. Capacitor Combinations (60 Hz Train Stops only)

Train stop layouts where the tripper arm is 2 1/2" to 3" above the top of the rail (in the stop position) have two 20 µF capacitors in their mechanism unit. Train stop layouts where the tripper arm is 3 1/2" above the top of the rail in the stop position have the 15 µF - 25 µF combination in their mechanism unit.

Figure 4-2 through Figure 4-7 show the wiring diagrams used for the various models of the EM-1 Train Stop.



* 20μf FOR P/N N387658
25μf FOR P/N N387658-002
20μf AND 20μf WITH OPTIONAL 5μf FOR P/N N387658007

50074-01

Figure 4-2. Wiring Diagram for EM-1 Train Stop N387658, N387658002, and N387658007

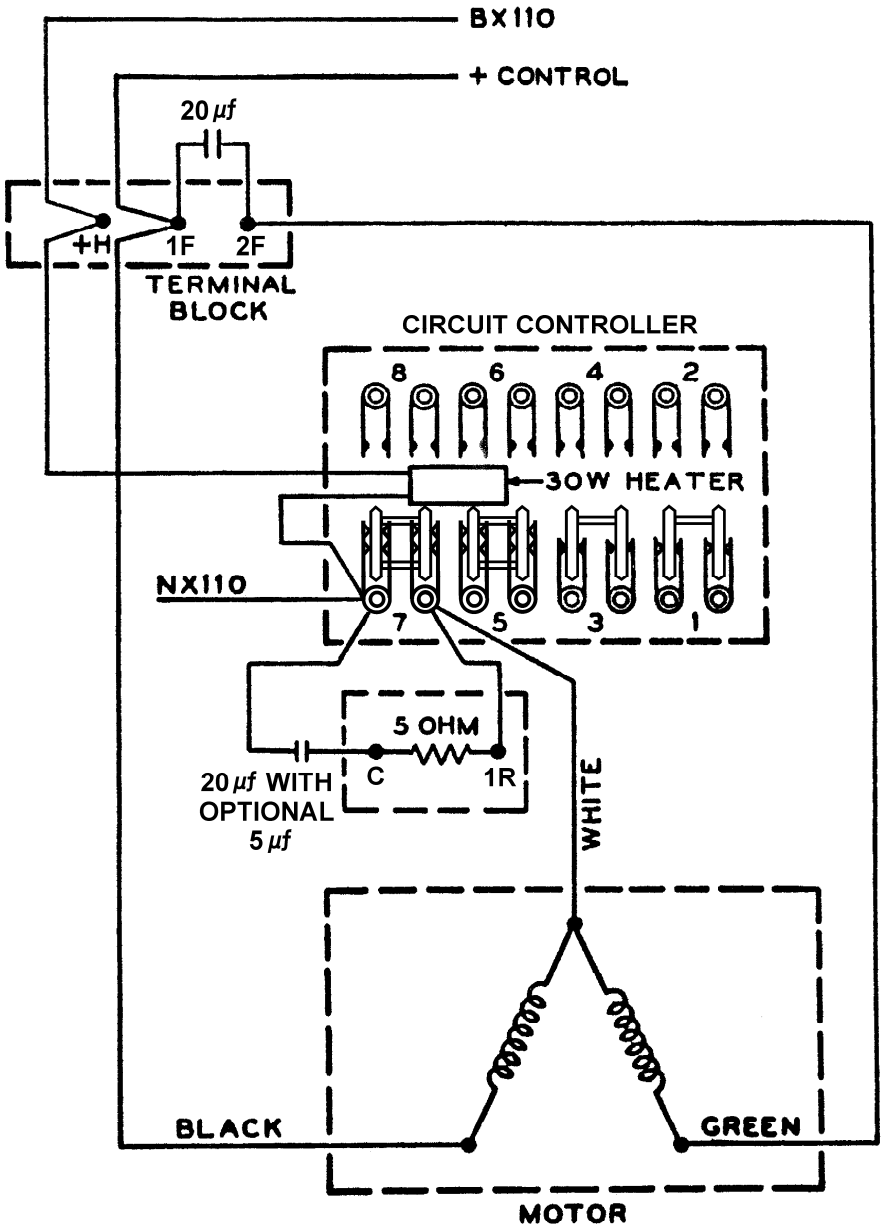


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Figure 4-3. Wiring Diagram for EM-1 Train Stops N388403 and N387658009

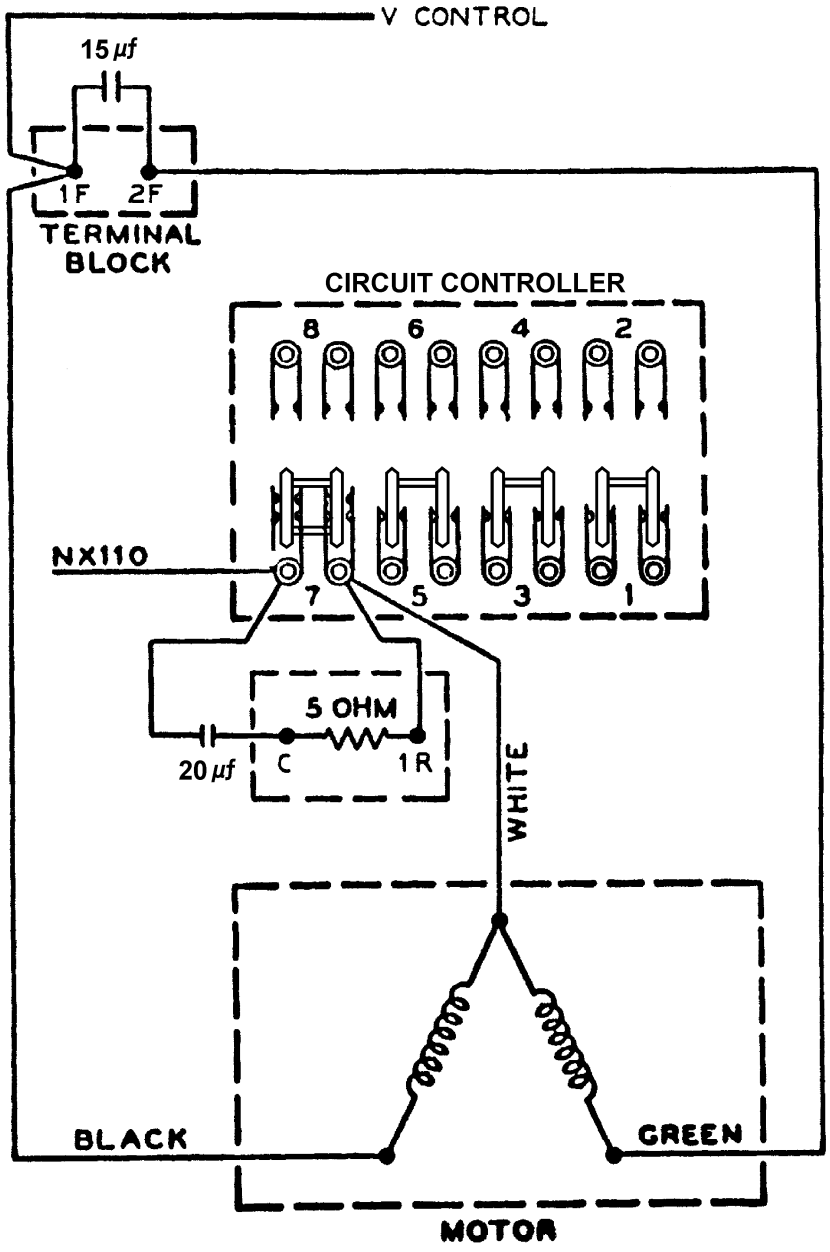

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Figure 4-4. Wiring Diagram for EM-1 Train Stop N387658004

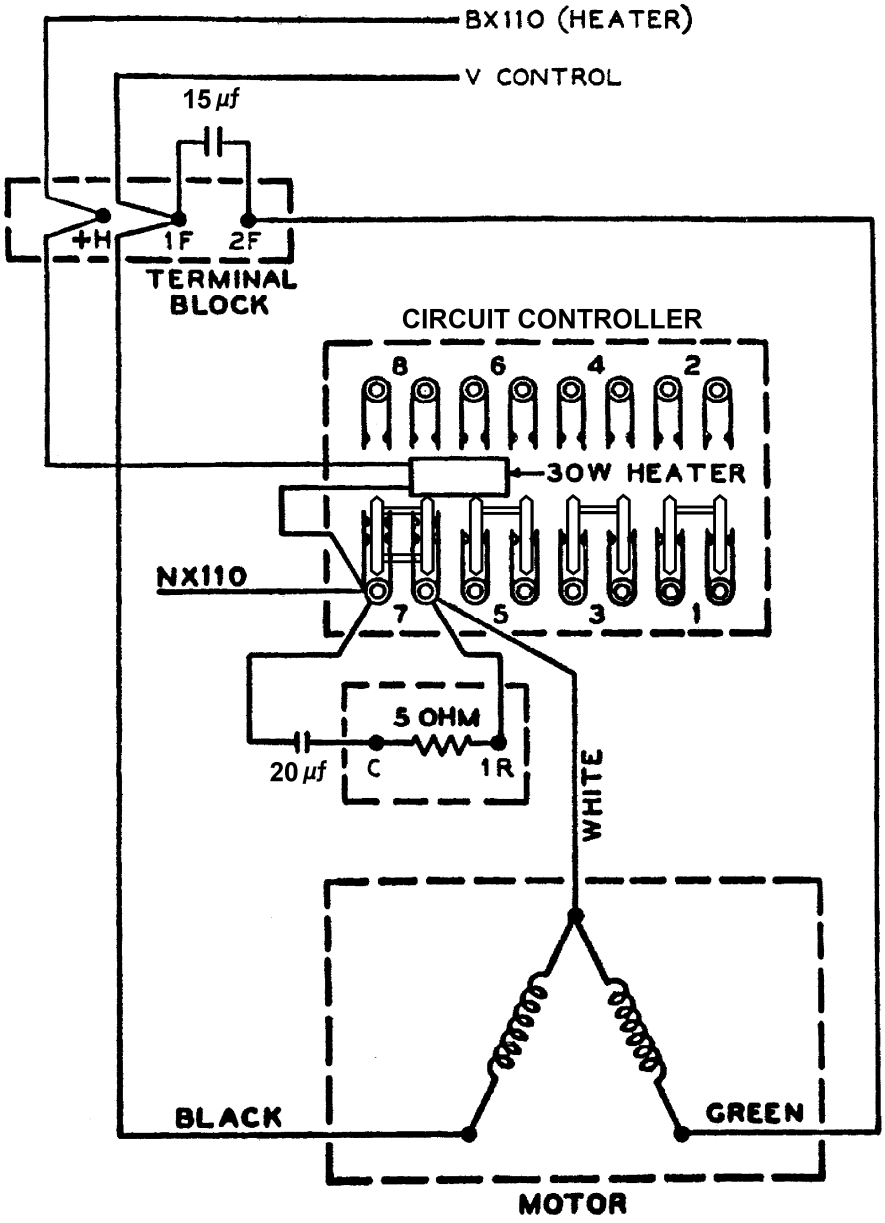

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Figure 4-5. Wiring Diagram for EM-1 Train Stop N387658003

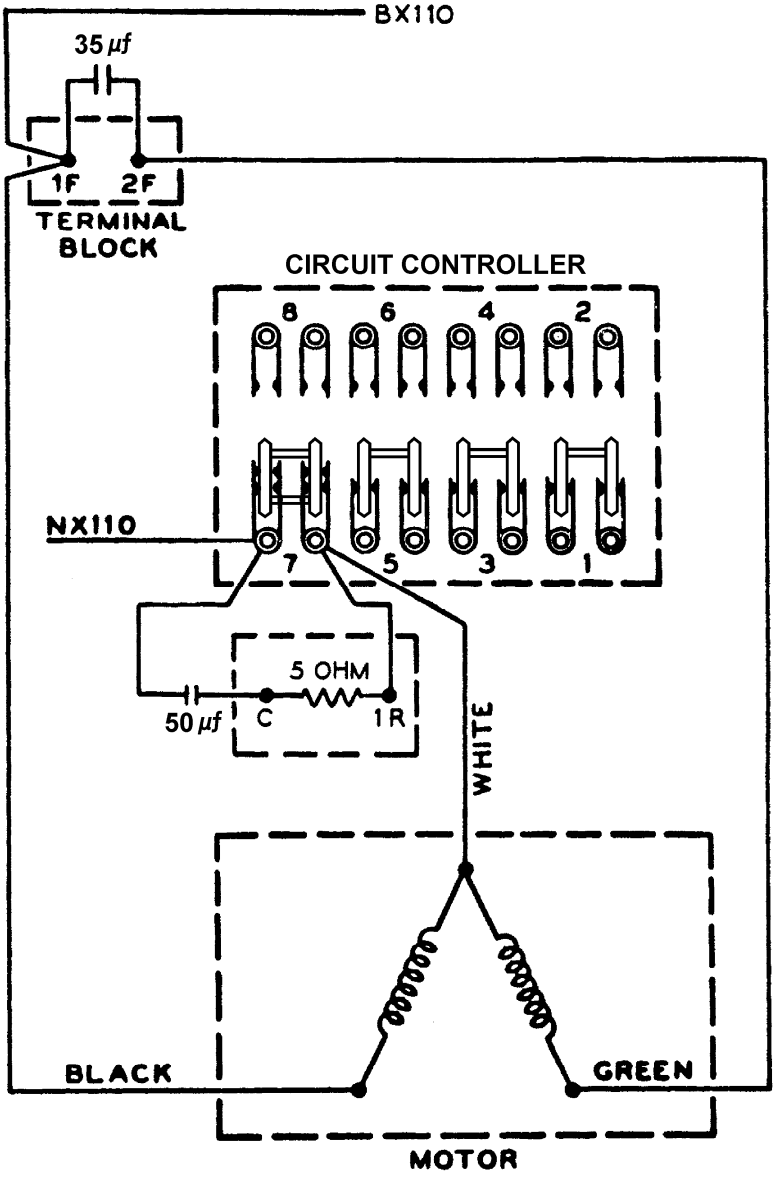

Figure 4-6. Wiring Diagram for EM-1 Train Stop N436240

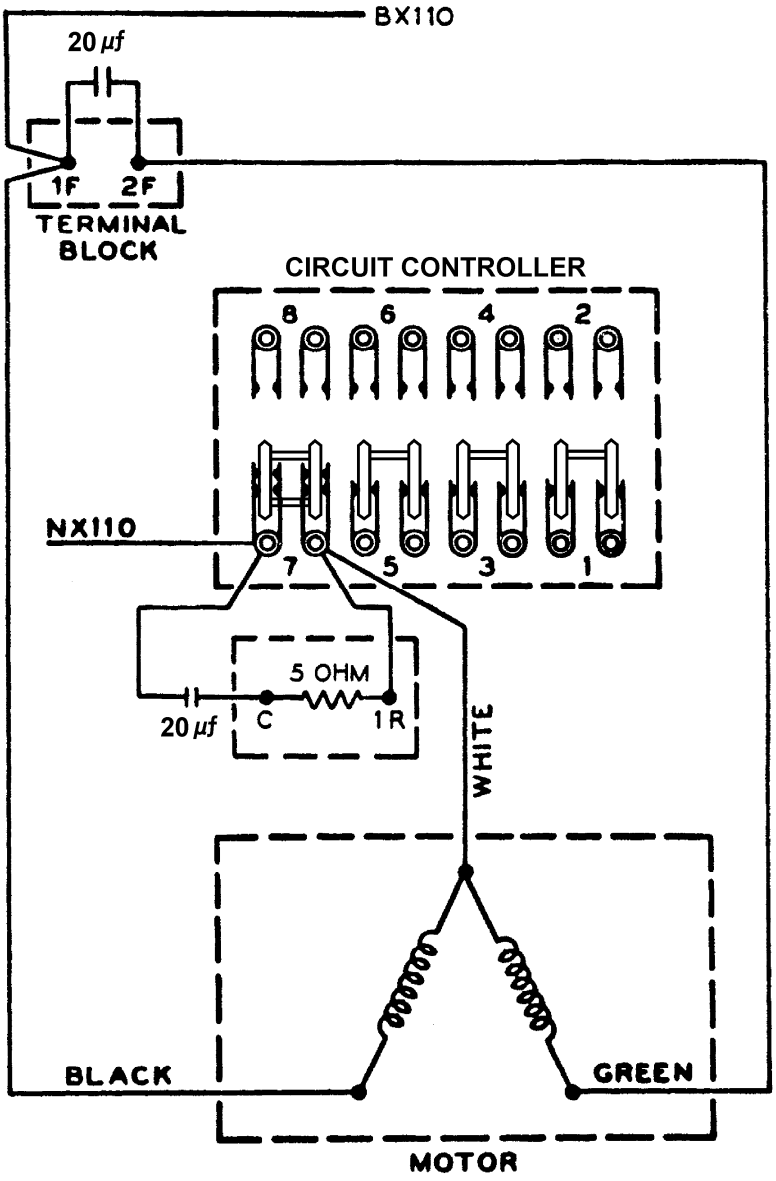

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Figure 4-7. Wiring Diagram for EM-1 Train Stop N4518010101

4.2. Parts List for EM-1 Train Stops N387658004, N387658003 and N4518010101

Table 4-3 is the Parts List for EM-1 Train Stops N387658004, N387658003, and N4518010101. Figures associated with this table are Figure 4-8 and Figure 4-9.

Table 4-3. EM-1 Electric Train Stop Parts List (N387658004, N387658003, N4518010101)

Item Number	Description	Part Number	Used On (1 = N387658004 2 = N387658003 3 = N4518010101)
1	Housing	M387827001	All
2	Cover, w/Pouch	N387831001	All
3	Hinge, Pin	M387609	All
4	Cotter Pin, 1/8" x 1-1/4" Steel	J048622	All
5	Hasp Stud	M387732001	All
6	Pin, Roll, 3/8" x 1-1/2"	J487292	All
7	Washer	M391200	All
8	Hasp	PN398641	All
9	Hood, Steel, .0677" x 48" x 120"	M000915	All
10	Screen, No. 28 Brass w/Cloth	M136089	All
11	Screen, Plate	M388367	All
12	Screw, 10-32 x 3/4" Round Hd, SS	J051670	3
13	Washer, No. 10 Steel Lock, Medium	J047733	All
14* (not shown)	Bracket, Resistor Mounting	PN4513713502	3
15	Pipe Plug, 1/2" CI	J032903	All
16	Plate, Brass. No. 14 x 1	M397799	All
17	Screw, 8-32 x 5/16" Fil Hd	J052064	All
18* (not shown)	Nut, 10-32, Hex. Stainless	J4802110105	3
19* (not shown)	Screw 10-32 x 1/2" SS FH	J5252720108	3
20	Shaft	M387608001	All
21	Key, 15 Woodruff 1/4" x 1"	J048760	All
22	Gear Segment	N397827001	All
23	Nut, 3/8 - 24", Hex Jam	J480294	2, 3
25	Rocker Stud	M387620	All
26	Screw, 3/8-16 x 4" Hex Hd	M387703	All
27	Spring Guide	M387605	All
28	Spring, Coil Steel	J680133	All
29	Stud, Pivot	M387621	All
30	Spring Retainer	M387607	All
31	Screw, 5/16" x 7/8" Hex Hd	J050037	All
32	Washer, 5/16" Pl Lock, Steel	J047526	All
33	Arm Cont Oper	PN394263	2, 3
34	Set Screw	M387705	All
35	Screw, Jam 5/8" Square Steel	M387676	All
36	Stud, 5/16" Steel Hex	M387675	All
37	Nut, 5/16", 2B Jam, UNC	J048007	All
38	Pin, 3/8" Steel, Rd	M387731	All
39	Cotter Pin, 1/16 x 1/2 Spring Steel	J048603	All
41	Nut, 1/4 - 20, 2B Jam, UNC	J048003	All

Item Number	Description	Part Number	Used On (1 = N387658004 2 = N387658003 3 = N4518010101)
42	Circuit Controller	PN387657	1, 2
		PN387657001	3
43	Screw, 1/4” x 1-1/2” Round Hd	J052509	All
44	Washer, Lock 1/4" Steel Medium	J047775	All
45	Gear Housing	N387656001	1, 3
		N387656002	2
46	Screw, 3/8 x 1-1/2 Hex Hd	J050057	All
47	Washer, Lock, SS, 3/8”	J4751210113	All
48	Gasket, Padding	M387654	1
		M387654005	2, 3
50	Capacitor, 20 µF, 370 VAC	J706579	1
		N47616701	2
		N47616601	3
52	Stud	M387706	1, 3
	Bracket, Cap. Hold Down	N47616801	2
53	Bracket, .0966 x 48 x 120, Steel	M387604	1, 2
	Bracket, Cap. Hold Down	N47616801	2
54	Nut, 1/4-20, ESNA, SS	J480260	All
55	Block Terminal	PN3883691	1
		N38836900	3
56	Screw, 1/4-20 x 3/4" Fil Hd	J052201	All
58	Ring, External Retaining	J792313	All
59	Capacitor, 20 µF, 370 VAC	J47616601	2
60	Washer, Lock, 1/2” Plate Steel	J047769	All
61	Nut, 5/16-18, Hex	J480289	3
62	Resistor, 5 ohms, 25 Watts, 5%	J072122	1, 2
63	Fitting, 1610 Alem Hyd	J039137	All
65	Nut, 14-24, Hex Hd, Brass NP	J480300	1, 2
66	Screw, 10-32 x 3/4" Rd	J052567	All
67	Washer, Lock, 10 Shk Prf, 1210	J047715	All
68	Bag	N387767	All
72	Outlet Wire	PN388335	All
73 (not shown)	Wire, 14 AWG, BK M-252-31	A045547	All
74	Screw, 1/2-13 x 1-3/4”, Hex Hd	J050095	All
76	Terminal, PGFT Amp 322310	J073100	3
(not shown)	Terminal, Amp 327743	J730111	1, 2
77	Protector, Pipe Thread	J032927	All
78	Washer, 17/64” x 9/16” Copper	J047818	1, 2
79	Nut, 5/16-18, Hex Hd	J480289	1, 2
80* (not shown)	Washer, Lock No. 10 SS	J4751210109	1, 2
81	Heater	PN388242	2
82	Heater Clamp	M388232	2
83	Screw, 10-32 x 3/8” Rd	J052564	2
84	Washer, No. 10 Lock, Steel, Medium	J047733	2
85* (not shown)	Washer, No. 10 Plate SS	J4751200110	3
86	Terminal Block	N388554001	2
90	Screw, 10-32 x 7/8” Rd	J052568	1, 2
95	Screw, 10-32 x 3/4" Rd	J052567	1, 2
100	Seal, Oil Dual Lip	J7900260001	All
105	Bearing, Deep Groove Ball	J0660370003	All

Item Number	Description	Part Number	Used On (1 = N387658004 2 = N387658003 3 = N4518010101)
110 (not shown)	Grease, Lithium EP-2	A0412270001	All
115 (not shown)	Wiring Diagram, EM-1 Train Stop	NA	1
		M47600301	2
		M47600501	3
120	Sealant, RTV, Black, No. 9732	J041505	All
200	Sealant, RTV, Black, No. 9732	A0420010004	2
(not shown)	Oil	PN392153	3

* Part of Resistor Mounting Bracket used on N4518010101 – not shown

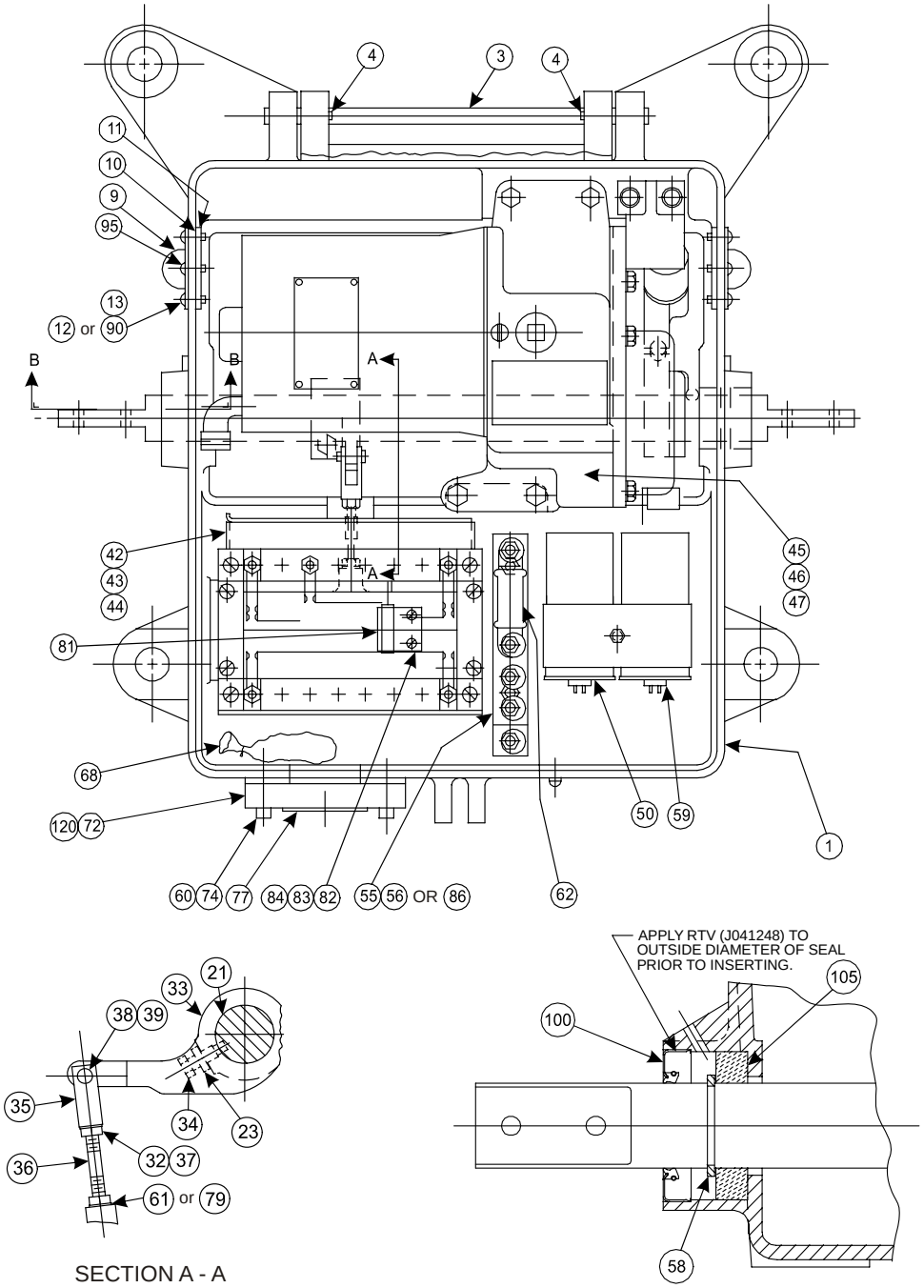

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Figure 4-8. Parts Location for EM-1 Train Stop N4518010101, N387658004, and N387658003

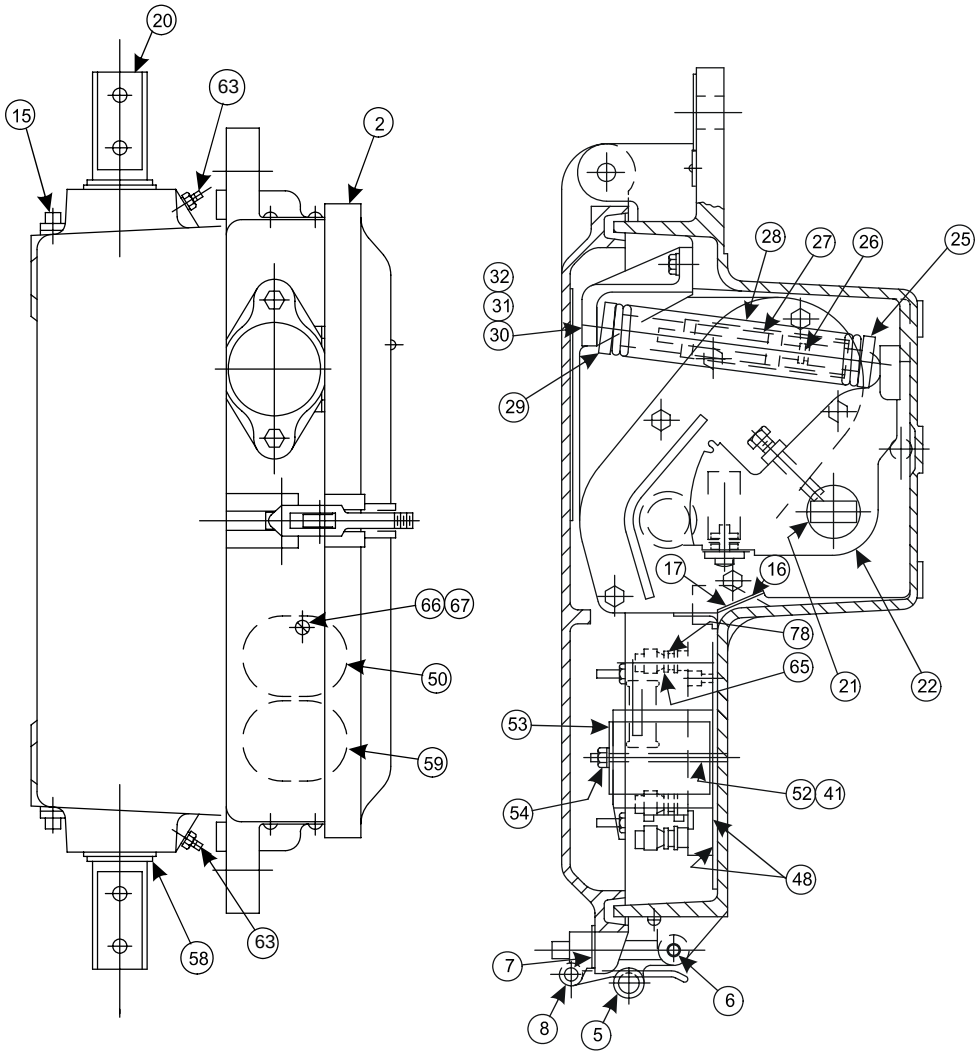

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Figure 4-9. Parts Location For EM-1 Train Stop N4518010101, N387658004, and N387658003

4.3. Parts List for EM-1 Train Stop N387658007

Table 4-4 is the Parts List for EM-1 Train Stop N387658007. The figures associated with this table are Figure 4-10 and Figure 4-11.

Table 4-4. EM-1 Electric Train Stop Parts List (N387658007)

Item Number	Description	Part Number
1	Housing	M387827002
2	Cover	N387831
3	Hinge, Pin	M387609
4	Cotter Pin, 1/8” x 1-1/4” Steel	J048622
5	Hasp Stud	M387732001
6	Pin, Roll, 3/8” x 1-1/2”	J487292
7	Washer	M391200
8	Hasp	PN398641
9	Hood, Steel, .0677 x 48 x 120	M000915
10	Screen, No. 28 Brass w/Cloth	M136089
11	Screen, Plate	M388367
13	Washer, No. 10 Steel Lock, Medium	J4751210109
15	Pipe Plug, 1/2” CI	J032903
16	Plate, Brass. No. 14 x 1	M397799
17	Screw, 8-32 x 5/16” Fil Hd	J052064
20	Shaft	M388340
21	Key, 15 Woodruff, 1/4” x 1	J048760
22	Gear Segment	N397827
23	Nut, 3/8-24, Hex Jam	J480294
25	Rocker Stud	M387620
26	Screw, 3/8-16 x 4” Hex Hd	M387703
27	Spring, Guide	M387605
28	Spring, Coil Steel	J680133
29	Stud, Pivot	M387621
30	Spring Retainer	M387607
31	Screw, 5/16” x 7/8” Hex Hd	J050037
32	Washer, 5/16” Pl Lock, Steel	J047526
33	Arm Cont Oper	PN394263
34	Set Screw	M387705
35	Screw, Jam 5/8” Square Steel	M387676
36	Stub, 5/16“ Steel Hex	M387675
37	Nut, 5/16”, 2B Jam, UNC	J048007
38	Pin, 3/8” Steel Rd	M387731
39	Cotter Pin, 1/16” x 1/2” Spring Steel	J048603
41	Nut, 1/4-20, 2B Jam, UNC	J048003
42	Circuit Controller	PN387657002
43	Screw, 1/4" x 1-1/2” Round Hd	J052509
44	Washer, Lock 1/4" Steel Medium	J047775
45	Gear Housing	PN387656002
46	Screw, 3/8” x 1-1/2” Hex Hd	J050057
47	Washer, Lock, SS, 3/8”	J4751210113
48	Gasket, Padding	M387654005
50	Capacitor, 20 µF, 370 VAC	N47616601
51	Capacitor, 20 µF+ 5 µF	N47616701
52	Stud	M387706
53	Bracket, Capacitor Hold Down	N47616801

Item Number	Description	Part Number
54	Nut, 1/4-20, ESNA, SS	J480260
55	Block Terminal	PN388369
56	Screw, 1/4-20 x 3/4" Fil Hd	J052201
57	Bearing, Oilite TT 2008	J792314
58	Ring, External Retaining	J792313
60	Washer, Lock, 1/2” Plate Steel	J047769
62	Resistor, 5 ohms, 25 Watts, 5%	J072122
63	Fitting, 1610 Alem Hyd	J039137
65	Nut, 14-24, Hex Hd, Brass NP	J480300
66	Screw, 10-32 x 3/4" Rd	J5072960108
67	Washer, Lock, 10 Shk Prf, 1210	J4751210125
68	Nut, Molded	J048300
72	Outlet Wire	N388335
73 (not shown)	W-14, AWG, BK M-252-31	A045547
74	Screw, 1/2-13 x 1-3/4” Hex Hd	J050092
76 (not shown)	Terminal, PGFT Amp 322310	J073100
77	Protector, Pipe Thread	J032927
78	Washer, 17/64” x 9/16” Copper	J047818
79	Nut, 5/16-18, Hex Hd	J480289
80 (not shown)	Fluid, Automatic Transmission	A041675
90	Screw, 10-32 x 3/4" Pan Hd	J5072960112
95	Screw, 10-32 x 5/8” Pan Hd	J507296110
110 (not shown)	Lubricant, Brake Cylinder #M-7651-2	A041353
120	Sealant, RTV, Black, No. 9732	J041505
130	Screw, 4 x 1/4", Hd, Metallic	J052501
135	Nameplate	N47608401
140	Nut, 14-24, Hex Brass	J480301
145 (not shown)	Cap, 1/4” Thread Protection	J70150100001
150	Washer, 10 Plate, SS	J4751200110
151	Tag, Silver, 1/8” x 1/2"	J7928222008
155	Conduit, Insuliner, 2” Diameter	J037600095
160	Bag	J055644
200 (Not Shown)	Sealant, RTV Black, #9732	A0420010004

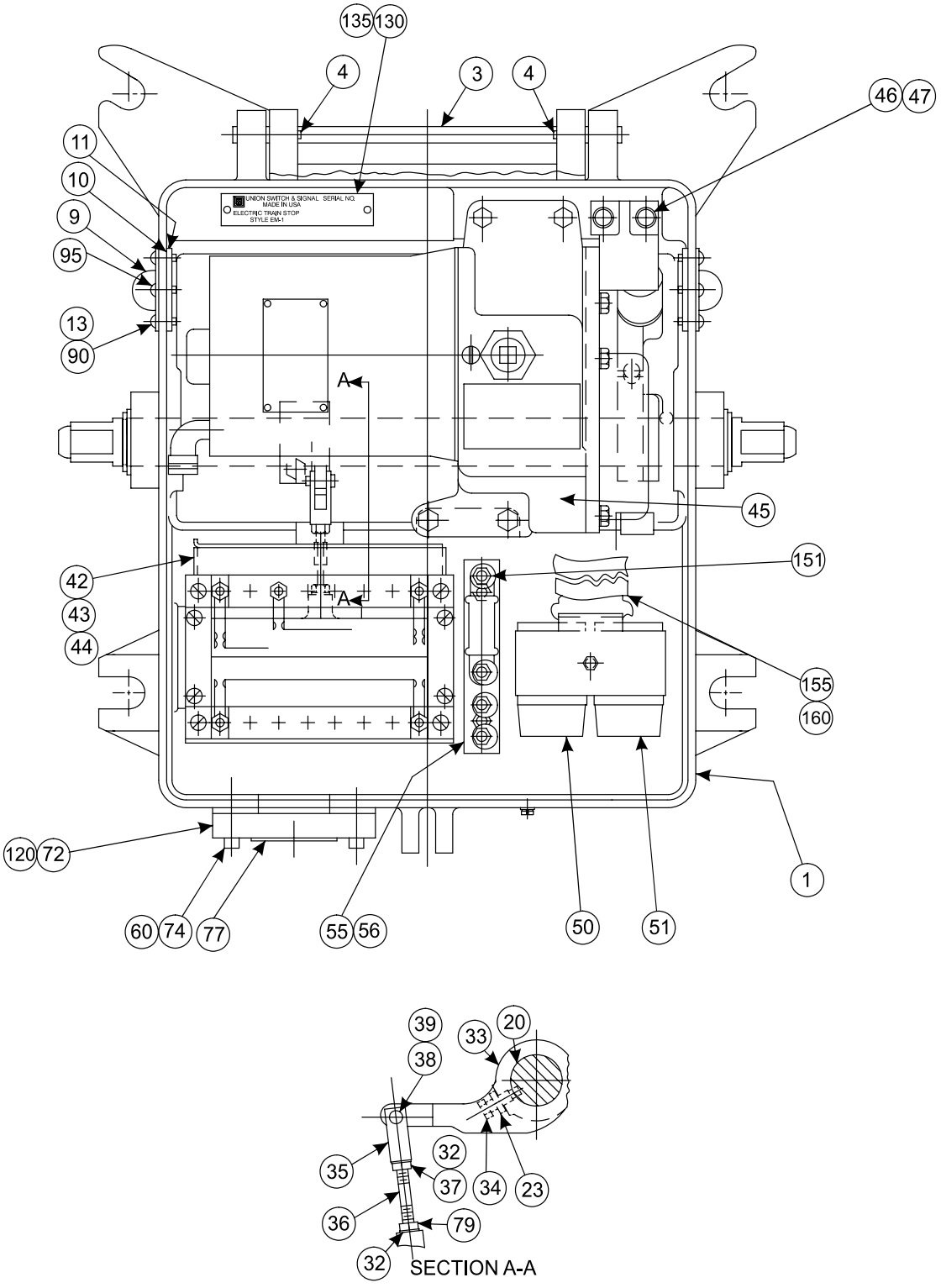


Figure 4-10. Parts Location For EM-1 Train Stop N387658007

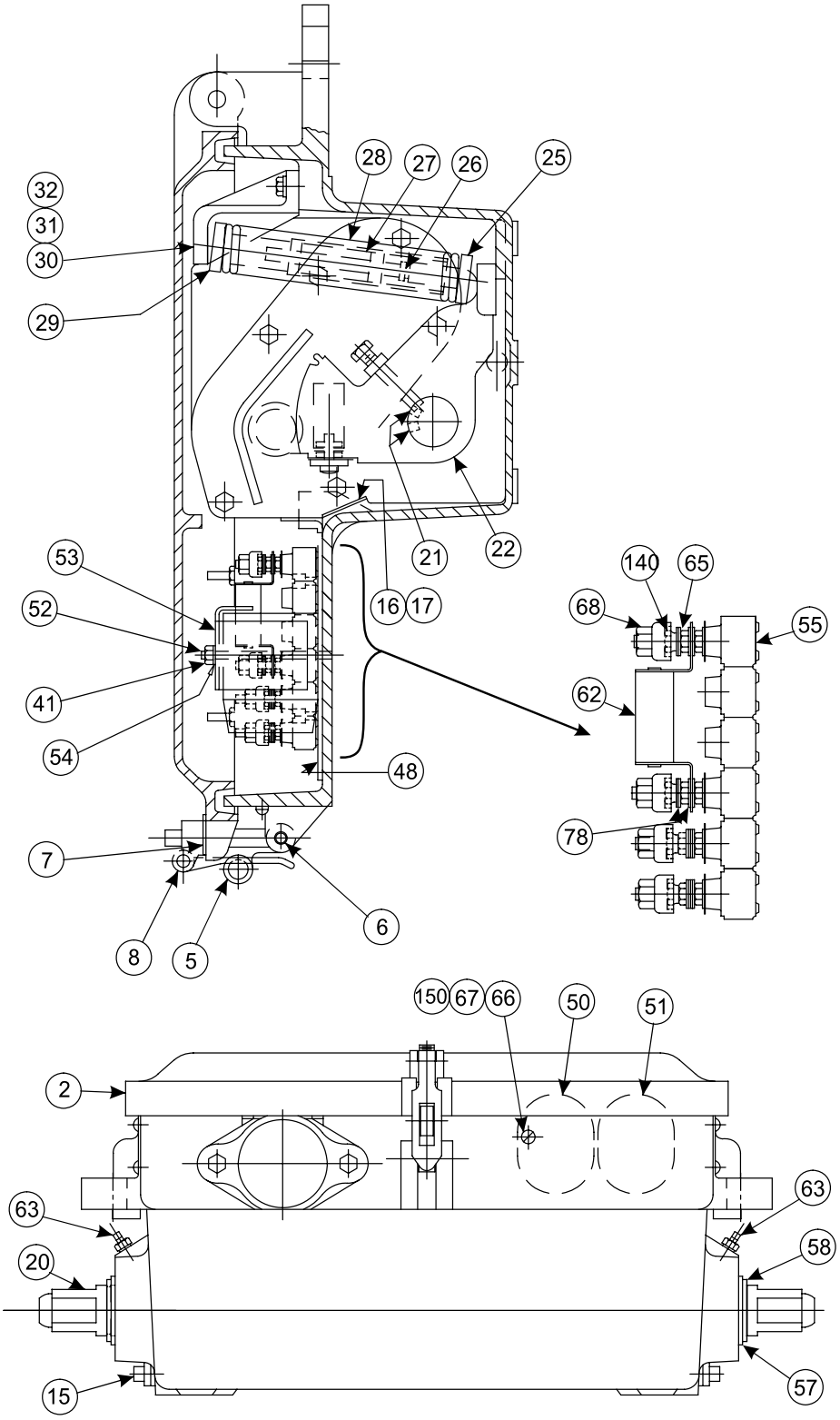


Figure 4-11. Parts Location For EM-1 Train Stop N387658007

Table 4-4 is the Parts List for EM-1 Train Stops N387658, N387658002, and N388403. Figures associated with this table are Figure 4-12, Figure 4-13, Figure 4-14, and Figure 4-15.

Table 4-5. EM-1 Electric Train Stop Parts List (N387658, N387658002, and N388403)

Item Number	Description	Part Number	Used On (1 = N387658 2 = N387658002 3 = N388403)
1	Housing	N387827	1, 3
		M387827001	2
2	Cover, w/Pouch	PN387831	1, 3
		N387831001	2
3	Hinge Pin	M387609	All
4	Cotter Pin, 1/8” x 1-1/4” Steel	J048622	All
5	Hasp Stud	M387732001	All
6	Pin, Roll, 3/8” x 1-1/2”	J487292	All
7	Washer	M391200	All
8	Hasp	PN398641	All
9	Hood, Steel, .0677 x 48 x 120	M000915	All
10	Screen, No. 28 Brass w/Cloth	M136089	All
11	Screen, Plate	M388367	All
13	Washer, No. 10 Steel Lock	J4751210109	2, 3
	Washer, No. 10 Lock Steel, Medium	J047733	1
14	Coupling	M159655	2
15	Pipe Plug, 1/2" CI	J032903	All
16	Plate, Brass. No. 14 x 1	M397799	All
17	Screw, 8-32 x 5/16” Fil Hd	J052064	All
18	Bolt, 1/2" x 3-3/4” Square Hd	J046667	2
19	Nut, 1/2-13 UNC 2B Heavy	J048013	2
20	Shaft, 1-1/2” Round Steel	M387608	1
		M388340	3
21	Key, 15 Woodruff, 1/4 x 1	J048760	All
22	Gear Segment	N397827	1, 3
		N397827001	2
23	Nut, 3/8-24, Hex Jam	J480294	All
25	Rocker Stud	M387620	All
26	Screw, 3/8-16 x 4” Hex Hd	M387703	All
27	Spring Guide	M387605	All
28	Spring, Coil Steel	J680133	All
29	Stud, Pivot	M387621	All
30	Spring Retainer	M387607	All
31	Screw, 5/16” x 7/8” Hex Hd	J050037	All
32	Washer, 5/16” Pl Lock, Steel	J047526	All
33	Arm Cont Oper	PN394263	All
34	Set Screw	M387705	All
35	Screw, Jam 5/8” Square Steel	M387676	All
36	Stud, 5/16“ Steel Hex	M387675	All
37	Nut, 5/16”, 2B Jam, UNC	J048007	All
38	Pin, 3/8” Steel Rd	M387731	All
39	Cotter Pin, 1/16” x 1/2" Spring Steel	J048603	All
41	Nut, 1/4-20, 2B Jam, UNC	J048003	All
42	Circuit Controller	N387657003	3
		PN387657	1, 2
43	Screw, 1/4" x 1-1/2” Round Hd	J052509	All
44	Washer, 1/4" Steel Lock Medium	J047775	All
45	Gear Housing	N387656001	2

Item Number	Description	Part Number	Used On (1 = N387658 2 = N387658002 3 = N388403)
		PN387656	1, 3
46	Screw, 3/8” x 1-1/2” Hex Hd	J050057	All
47	Washer, Lock, SS, 3/8”	J4751210113	All
48	Gasket, Padding	M387654005	All
49	Fitting, 1610-B Hyd Alem	J039142	2
50	Capacitor	N47605901	1
		N4517700101	2
		N47616601	3
51	Shaft	M388340	2
	Capacitor, 20 µF+ 5 µF	N47616701	3
52	Stud	M387706	All
53	Bracket, .0966 x 48 x 120, Steel	M387604	1, 2
	Bracket, Capacitor Hold Down	N47616801	3
54	Nut, 1/4-20, ESNA, SS	J480260	All
55	Block Terminal	PN388369	2
56	Screw, 1/4-20 x 3/4" Fil Hd	J052201	2, 3
57	Bearing, Oilite TT 2008	J792314	1, 3
58	Ring, External Retaining	J792313	All
59	Capacitor, 20 µF+ 5 µF	N4760570	1
60	Washer, Lock, 1/2” Plate Steel	J047769	All
62	Resistor, 5 ohms, 25 Watt, 5%	J072122	All
63	Fitting, 1610 Alem Hyd	J039137	All
65	Nut , 14-24, Hex, Brass, NP	J480300	All
66	Screw, 10-32 x 3/4" Rd	J052567	1, 2
	Screw, 10-32 x 1/2" Pan Hd SS	J5072960108	3
67	Washer, Lock, 10 Shk Prf, 1210	J047715	1, 2
	Washer, Lock, 10 Shk Prf, 1210	J4751210125	3
68	Bag	N387767	All
72	Outlet Wire	PN388335	All
73 (not shown)	W-14, AWG, BK M-252-31	A045547	All
74	Screw, 1/2-13 x 1-3/4” Hex Hd	J050095	All
76 (not shown)	Terminal, PGFT Amp 322310	J073100	All
77	Protector, Pipe Thread	J032927	All
78	Washer, 17/64 x 9/16” Copper	J047818	All
79	Nut, 5/16-18 Hex	J480289	All
80	Oil	N392153	1, 2
(not shown)	Fluid Auto Transmission	A041675	3
81	Heater	PN388242	1, 3
82	Heater Clamp	M388232	1, 3
83	Screw, 10-32 x 3/8” Rd	J052564	1, 3
84	Washer, No. 10, Steel, Lock, Medium	J047733	1, 3
86	Terminal Block	N388554001	1, 3
90	Screw, 10-32 x 7/8” Rd	J052568	All
95	Screw 10-32 x 3/4" Rd	J052567	All
100	Seal, Oil Dual Lip	J7900260001	2
105	Bearing, Deep Groove Ball	J0660370003	2
110	Lubricant, Br Cylinder No. M-7651-2	A041353	1, 3
(not shown)	Grease, Lithium EP-2	A0412270001	2
115 (not shown)	Wiring Diagram, EM-1 Train Stop	M47600201	2

Item Number	Description	Part Number	Used On (1 = N387658 2 = N387658002 3 = N388403)
120	Sealant, RTV, Black, No. 9732	J041505	All
125	Name Plate	M47608401	3
126	Screw, 4” x 1/4" Heavy Duty Metallic	J052501	3
127	Coupling	M159655	3
128	Bolt, 1/2" x 3-3/4”, Square Hd	J046667	3
129	Nut, 1/2-13 UNC 2B Heavy	J048013	3
130	Washer, 1/2" Pl, Steel, Lock	J047769	3
131	Fitting, 1610B, Hyd Alem	J039142	3
200 (not shown)	Sealant, RTV Black, No. 9732	A0420010004	1, 3

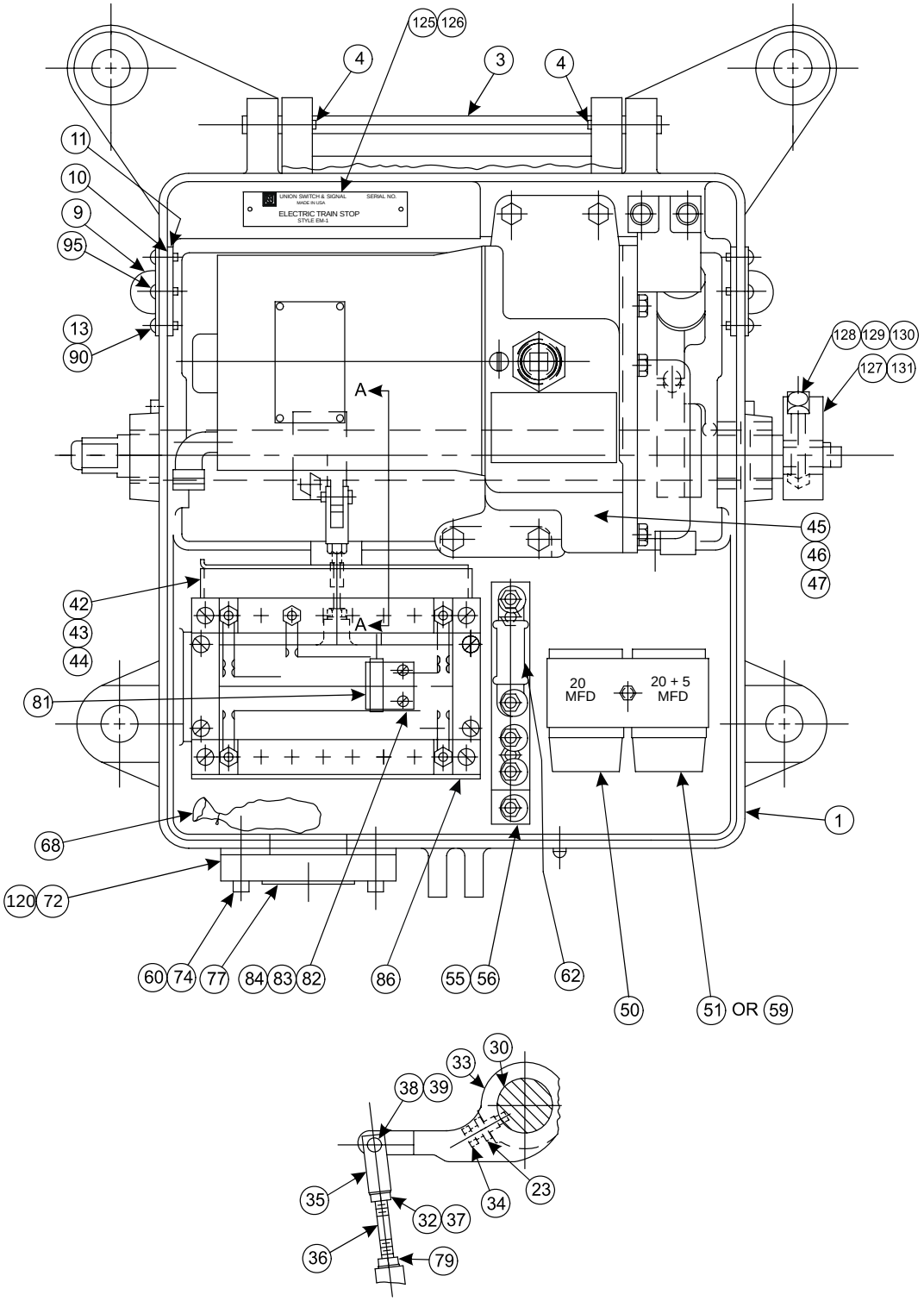


Figure 4-12. Parts Location for EM-1 Train Stops N387658 and N387658002

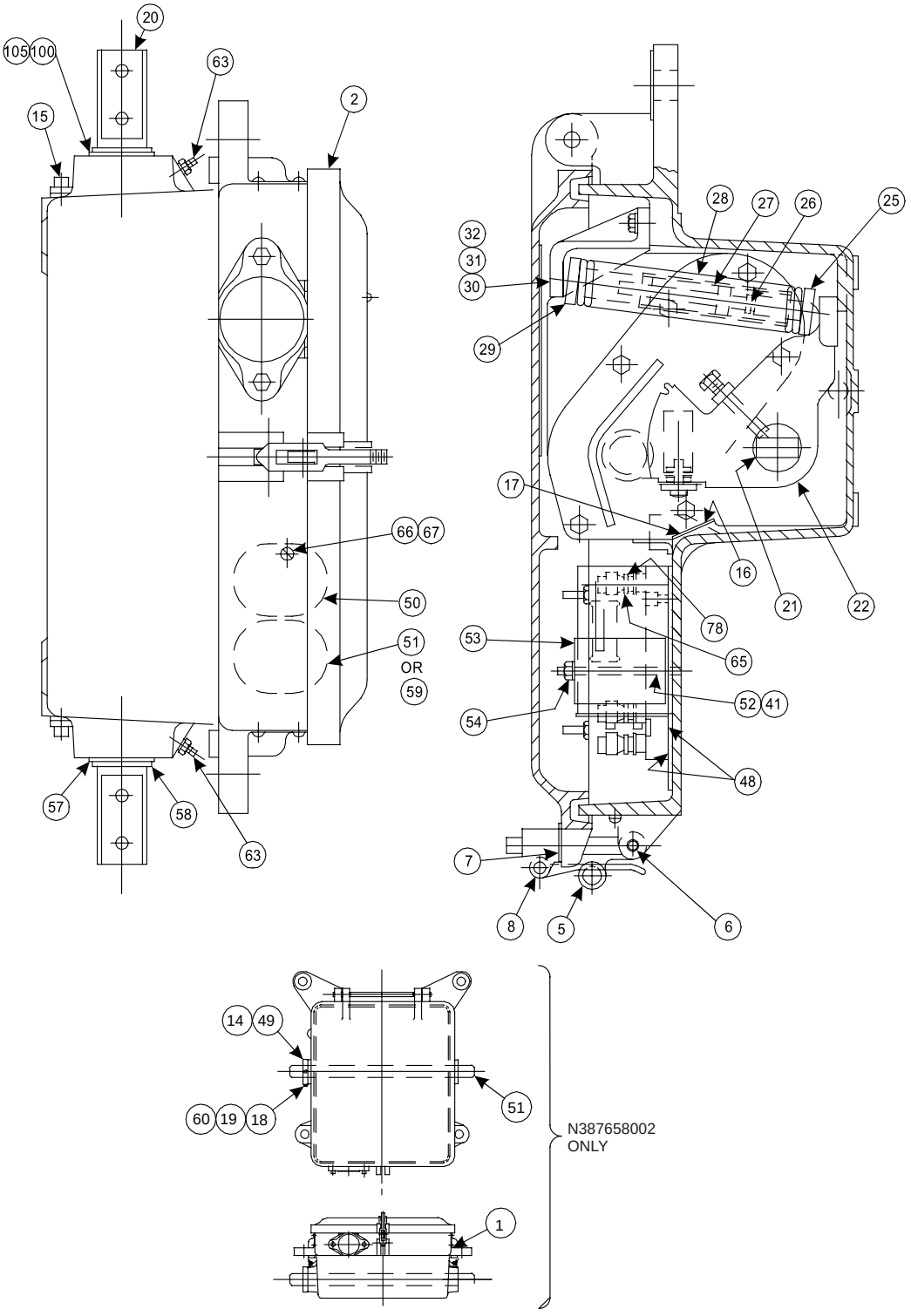


Figure 4-13. Parts Location for EM-1 Train Stop N387658 and N387658002

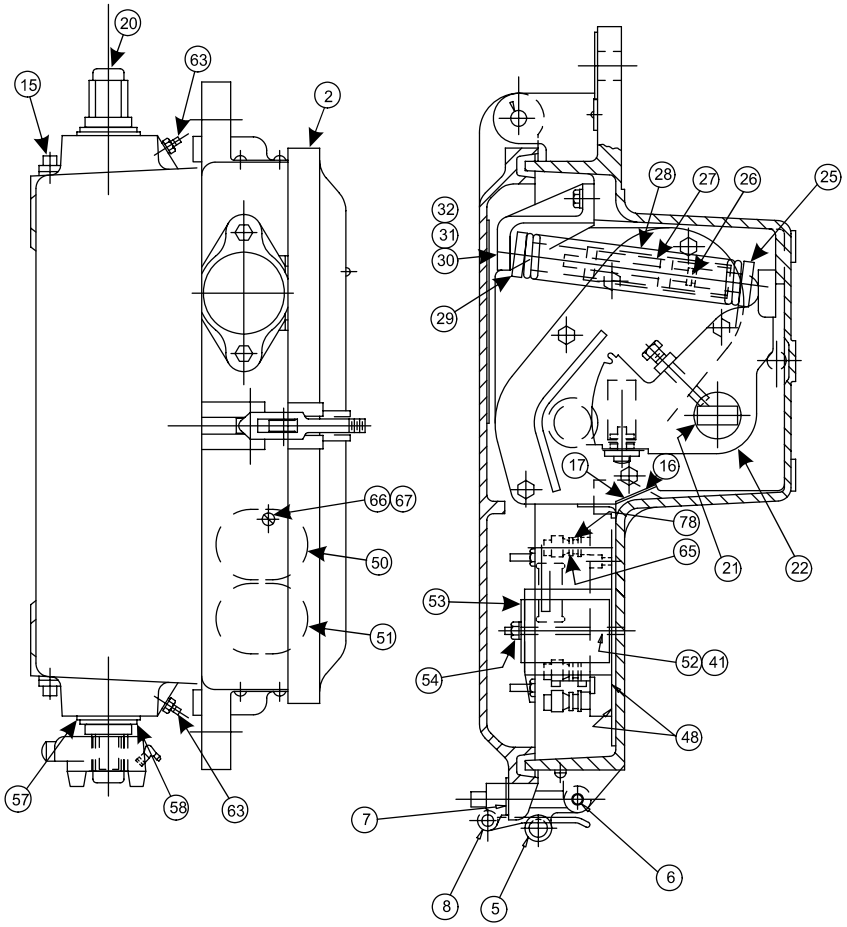


Figure 4-14. Parts Location for EM-1 Train Stop N388403

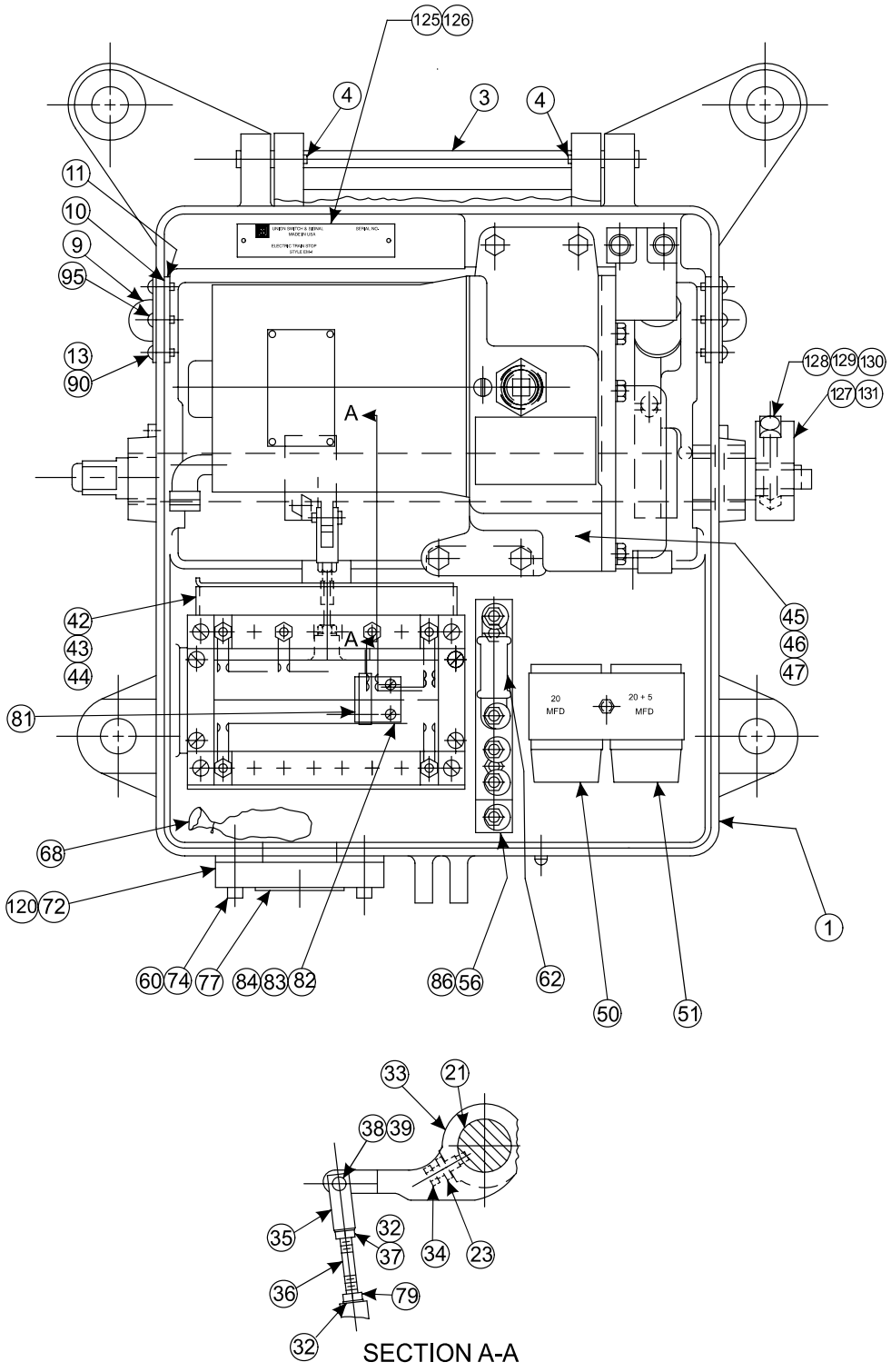


Figure 4-15. Parts Location for EM-1 Train Stop N388403

4.4. Parts List for EM-1 Train Stop N387658009

Table 4-6 is the Parts List for EM-1 Train Stop N387658009. The figures associated with this table are Figure 4-16 and Figure 4-17.

Table 4-6. EM-1 Electric Train Stop Parts List (N387658009)

Item Number	Description	Part Number
1	Housing	M387827
2	Cover	N387831
3	Hinge, Pin	M387609
4	Cotter Pin, 1/8” x 1-1/4” Steel	J048622
5	Hasp Stud	M387732001
6	Pin, Roll, 3/8” x 1-1/2”	J487292
7	Washer	M391200
8	Hasp	N398641
9	Hood, Steel, .0677 x 48 x 120	M000915
10	Screen, No. 28 Brass w/Cloth	M136089
11	Screen, Plate	M388367
12	Washer, No. 10 Steel Lock, Medium	J4751210109
13	Pipe Plug, 1/2” CI	J032903
14	Plate, Brass. No. 14 x 1	M397799
15	Screw, 8-32 x 5/16” Fil Hd	J052064
16	Shaft, 1-1/2” Round Steel	M387608
17	Key, 15 Woodruff 1/4” x 1”	J048760
18	Gear Segment	N397827
19	Nut, 3/8-24, Hex Jam	J480294
20	Rocker Stud	M387620
21	Screw, 3/8-16 x 4” Hex Hd	M387703
22	Spring Guide	M387605
23	Spring, Steel Coil	J680133
24	Stud, Pivot	M387621
25	Spring Retainer	M387607
26	Screw, 5/16” x 7/8” Hex Hd	J050037
27	Washer, 5/16” PL Lock, Steel	J047526
28	Arm Contr Oper	N394263
29	Set Screw	M387705
30	Screw, Jam 5/8” Square Steel	M387676
31	Stud, 5/16“ Steel Hex	M387675
32	Nut, 5/16”, 2B Jam, UNC	J048007
33	Pin, 3/8” Steel Rd	M387731
34	Cotter Pin, 1/16” x 1/2” Spring Steel	J048603
35	Nut, 1/4-20, 2B Jam, UNC	J048003
36	Circuit Controller	N387657003
37	Screw, 1/4" x 1-1/2” Round Hd	J052509
38	Washer, 1/4” Steel Lock Medium	J047775
39	Gear Housing	N387656
40	Screw, 3/8” x 1-1/2” Hex Hd	J050057
41	Washer, Lock, SS, 3/8”	J4751210113
42	Gasket	M387654005
43	Capacitor, 20 µF	N47616601
44	Capacitor, 20 µF + 5 µF	N47616701
45	Stud	M387706

Item Number	Description	Part Number
46	Bracket, Cap Hold Down	N47616801
47	Nut, 1/4-20, ESNA, SS	J480260
48	Screw, 1/4-20 x 3/4" Fil Hd	J052201
49	Bearing Oilite TT 2008	J792314
50	Ring, External Retaining	J792313
51	Washer, Lock, 1/2” Plate Steel	J047769
52	Resistor, 5 ohms, 25 Watts, 5%	J072122
53	Fitting, 1610 Alem Hyd	J039137
54	Nut, 14-24, Hex Hd, Brass NP	J480300
55	Screw, 10-32 x 1/2" Pan, SS	J5072960108
56	Washer, Lock, 10 Shk Prf, SS	J4751210125
57	Bag	N387767
58	Outlet Wire	N388335
59 (not shown)	W-14, AWG, BK M-252-31	A045547
60	Screw, 1/2-13 x 1-3/4” Hex Hd	J050095
62 (not shown)	Terminal, PGFT Amp 322310	J073100
63	Protector, Pipe Thread	J032927
64	Washer, 17/64” x 9/16” Copper	J047818
65	Nut, 5/16-18, Hex Hd	J480289
66 (not shown)	Automatic Transmission Fluid	A041675
67	Heater	N388242
68	Heater Clamp	M388232
69	Screw, 10-32 x 3/8” Rd	J052564
70	Washer, Lock, No. 10 SS, Medium	J047733
71	Terminal Block	N388554001
72	Screw, 10-32 x 7/8” Rd	J052568
73	Screw, 10-32 x 3/4" Rd	J052567
74 (not shown)	Brake Cylinder Lubricant, #M-7651-2	A041353
75	Component, Formagasket #2	J041505
76	Nameplate	M46708401
77	Screw, #4 x 1/4"	J052501
78 (not shown)	Sealant, RTV, Black, Bostic 9732	A0420010004

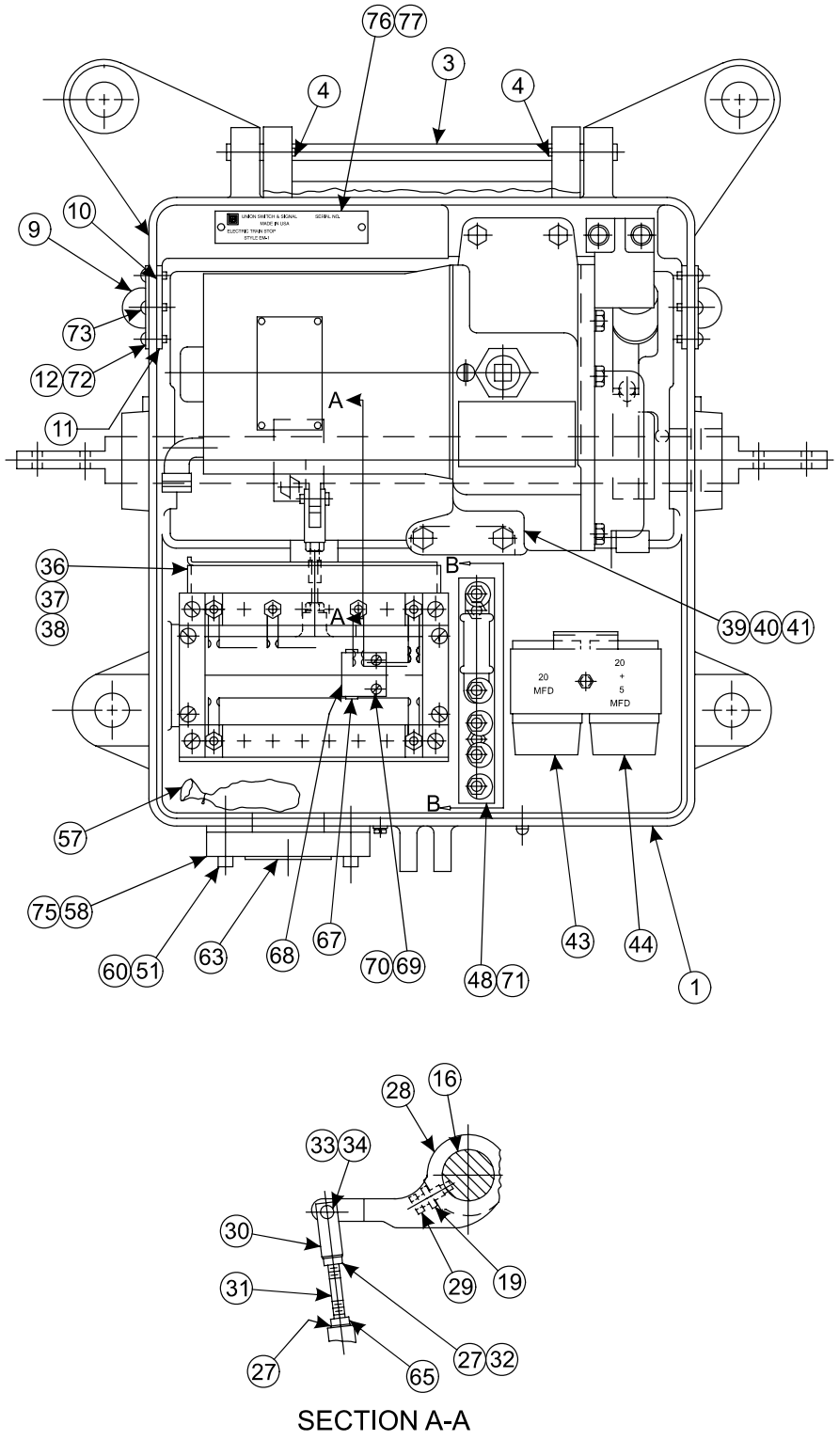


Figure 4-16. Parts Location for EM-1 Train Stop N38765009

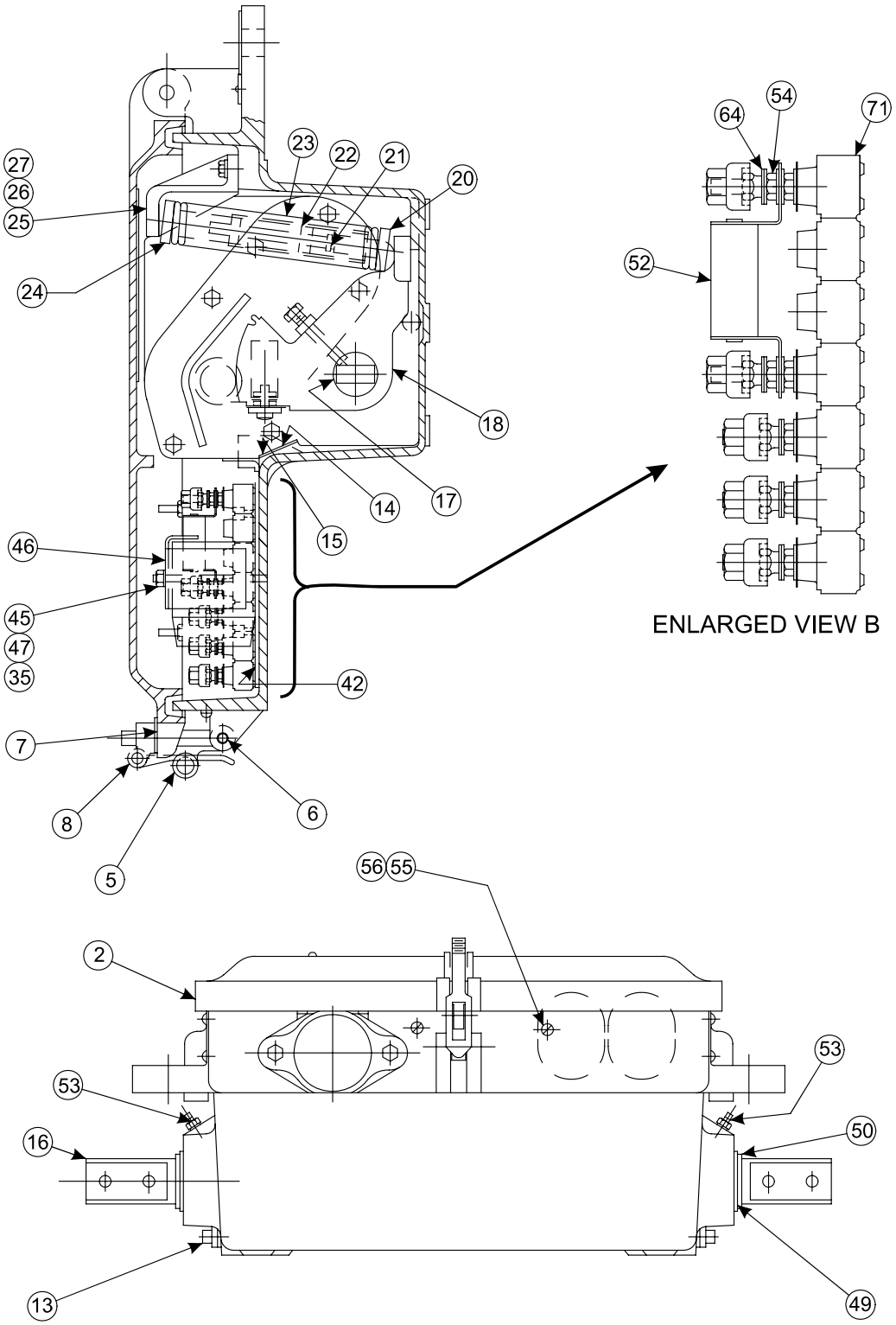


Figure 4-17. Parts Location for EM-1 Train Stop N38765009

Table 4-1 is the Parts List for EM-1 Train Stop N436240. Figures associated with this table are Figure 4-18 and Figure 4-19.

Table 4-7. Parts List for EM-1 Electric Train Stop (N436240)

**(Note – This top level part number, N436240, is obsolete.
This information is included for units that might still be in use.)**

Item Number	Description	Part Number
1	Housing	N436239
2	Cover	N387831
3	Hinge Pin	M387609
4	Cotter Pin, 1/8” x 1-1/4” Steel	J048622
5	Hasp Stud	M387732
6	Pin, Roll, 3/8” x 1-1/2”	J487292
7	Washer	M391200
8	Hasp	N398641
9	Hood, Steel, .0677 x 48 x 120	M000915
10	Screen, No. 28 Brass w/Cloth	M136089
11	Screen, Plate	M388367
12	Screw, 10-32 x 5/8” Rd Brass	J051669
13	Washer, No. 10 Lock, Steel, Medium	J047733
14	Pipe Plug, 1/2" CI	J032903
15	Plate, Brass No. 14 x 1	M397799
16	Screw, 8-32 x 5/16” Fil Hd	J052064
17	Shaft	M387608
18	Key, 15 Woodruff 1/4" x 1”	J048760
19	Gear Segment	N39782701
20	Nut, 3/8-24, Hex Jam	J480294
21	Rocker Stud	M387620
22	Screw. 3/8-16 x 4” Hex Hd	M387703
23	Spring Guide	M387605
24	Spring, Coil Steel	J680133
25	Stud, Pivot	M387621
26	Spring Retainer	M387607
27	Screw, 5/16” x 7/8” Hex Hd	J050037
28	Washer, 5/16” Pl Lock, Steel	J047526
29	Arm Cont Oper	N394263
30	Set Screw	M387705
31	Screw, Jam 5/8” Square Steel	M387676
32	Stub, 5/16“, Steel Hex	M387675
33	Nut, 5/16”, 2B Jam, UNC	J048007
34	Cotter Pin, 1/16” x 1/2” Spring Steel	J048603
35	Capacitor, 35 µF, 370 VAC	J7091440087
36	Terminal Board	N4511430302
37	Circuit Controller	N387657
38	Screw, 1/4" x 1-1/2” Round Hd	J052509
39	Washer, 1/4” Steel Lock Medium	J047775
40	Gear Housing	N387656001
41	Screw, 3/8” x 1-1/2” Hex Hd	J050057
42	Washer, Lock, SS, 3/8”	J4751210113
43	Gasket	M387654001
44	Gasket	M387654002

Item Number	Description	Part Number
45	Capacitor, 50 µF, 370 VAC	J7091440086
46	Stud	M436252
47	Bracket	N4511870501
48	Board Terminal	N45114300202
49	Screw, 1/4-20 x 3/4" Fil	J052201
50	Ring, External Retaining	J792313
51	Washer, Lock, 1/2” Plate Steel	J047769
52	Resistor, 5 ohms, 25 Watt	J072122
53	Fitting, 1610 Alem Hyd	J039137
54	Nut , 14-24, Hex, Brass, NP	J480300
55	Screw, 10-32 x 1/2" Rd	J052565
56	Washer, Lock, 10 Shk Prf, 1210	J047715
57	Bag	N387767
58	Screw, 1/4-20 x 1/2”, Hex	J050012
59	Outlet Wire	N388335
60 (not shown)	W 16 Ga, BK M-252-31	A045547
61	Screw, 1/2-13 x 1-3/4” Hex Hd	J050095
63 (not shown)	Terminal, PGFT Amp 322310	J073100
64	Protector, Pipe Thread	J032927
65	Washer, 17/64” x 9/16” Copper	J047818
66	Nut, 5/16-18 Hex	J480289
67 (not shown)	Oil	N392153
68	Capacitor Bracket	M451187-0501
69	Pin	M387731

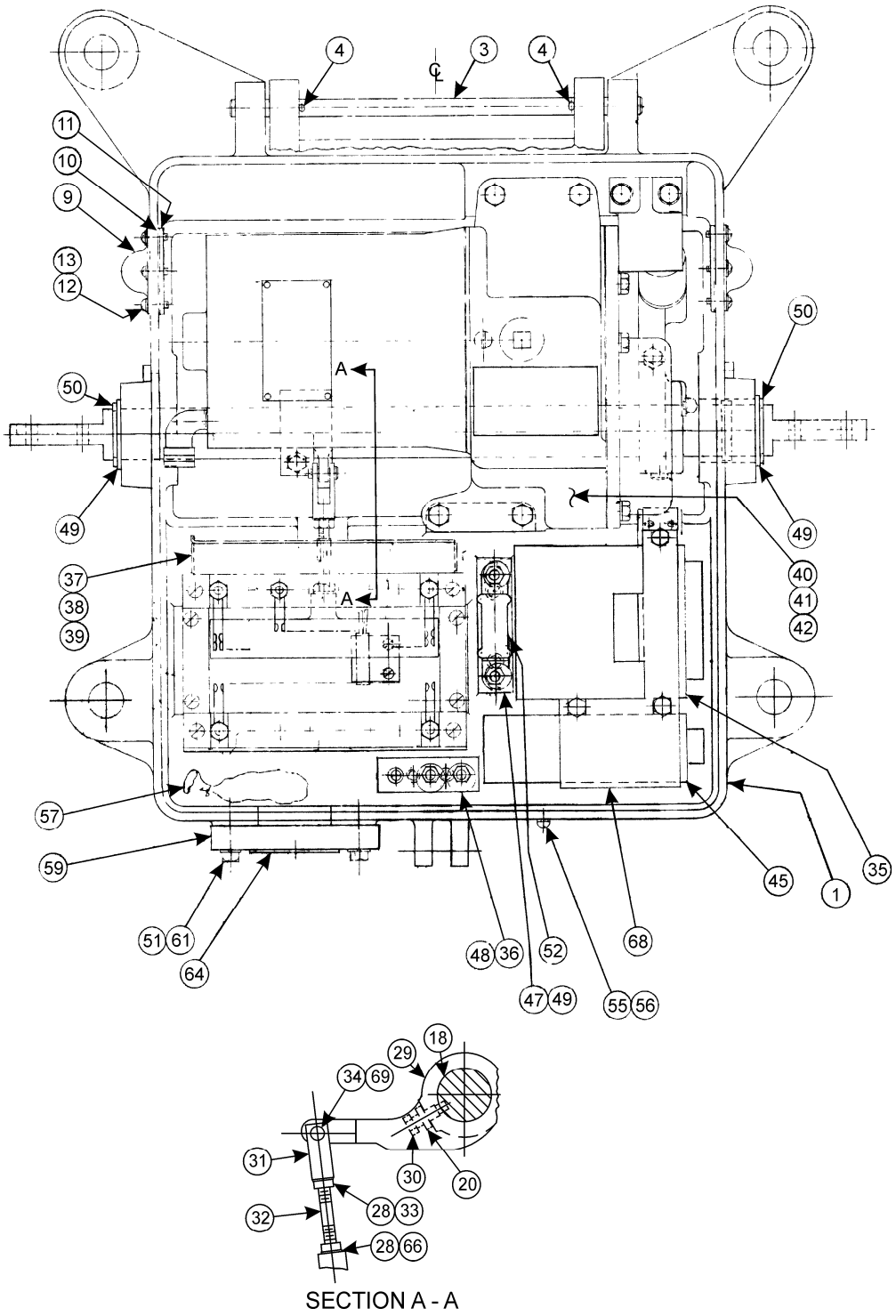


Figure 4-18. Parts Location for EM-1 Train Stop N436240

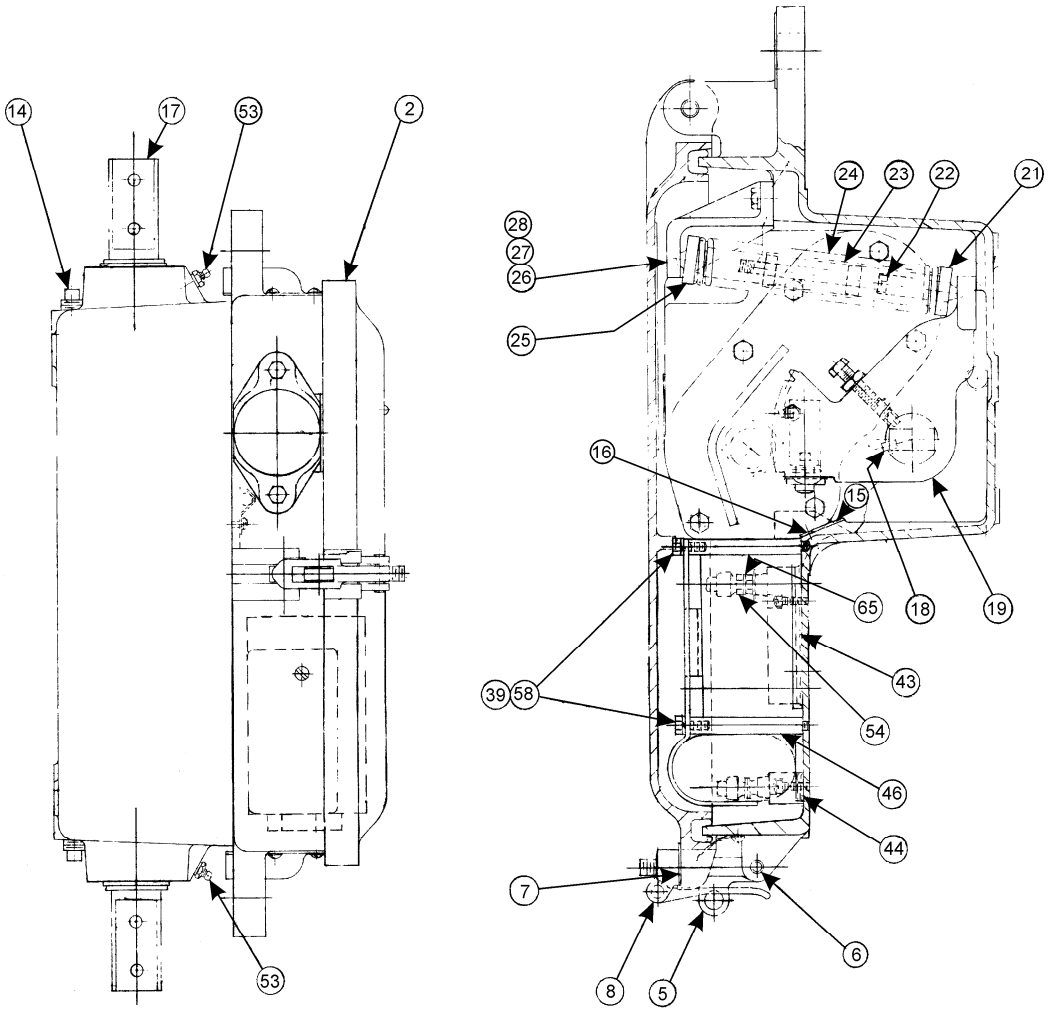


Figure 4-19. Parts Location for EM-1 Train Stop N436240

Table 4-8 is the Parts List for EM-1 Train Stop Circuit Controllers N387657, N387657001, N387657002, and N387657003. The figure associated with this table is Figure 4-20.

Table 4-8. Parts List For EM-1 Train Stop Circuit Controller (N387657, N387657001, N387657002, and N387657003)

Item Number	Description	Part Number	Used On (1 = N387657 2 = N387657001 3 = N387657002 4 = N387657003)
1	Breaker, Contact	N387777	All
2	Rear Support	N387616001	2
5	Guide, 3/4" x 2-1/2" Steel	M387618	All
6	Support, Rear	M387616	1, 3
7	Support, Front	M387617	All
8	Board, Terminal	M388643	All
9	Screw, 1/4-20 x 1" Rd Hd SS	J525264	All
10	Washer, 1/4", Steel, Lock, T. Pl	J047775	All
11	Block, Spring Support	M436499	All
12	Post, Terminal, 1-3/4-24	M160475	All
13	Spring, Contact	R387648	All
14	Spring, Contact	R387650	All
15	Spring, Contact	R387652	All
16 (not shown)	Block, Spring Retainer	M436500	All
17	Nut, 14-24, Hex. Brass NP	J480300	All
18	Block, Contact	N388647	All
19	Screw. 8-32 x 9/16" Pan Hd	J5072950109	All
20	Washer, No. 8 Steel, Shk Prf, Lock, T. Pl	J047714	All
21	Contactor, Wide	N436606	All
22	Contactor, Narrow	N436607	All
23	Screw, 8-32 x 11/16" Pan Hd, T. Pl	J5072950111	All
24	Bag, Parts	N381607	1, 2, 4
25	Contact Spring	R432462	All
26	Washer, 17/64" x 9/16", Copper	J047818	3
27	Nut, 14-24 Hex Hd, Brass	J480300	3
28	Nut, Molded	J048300	3

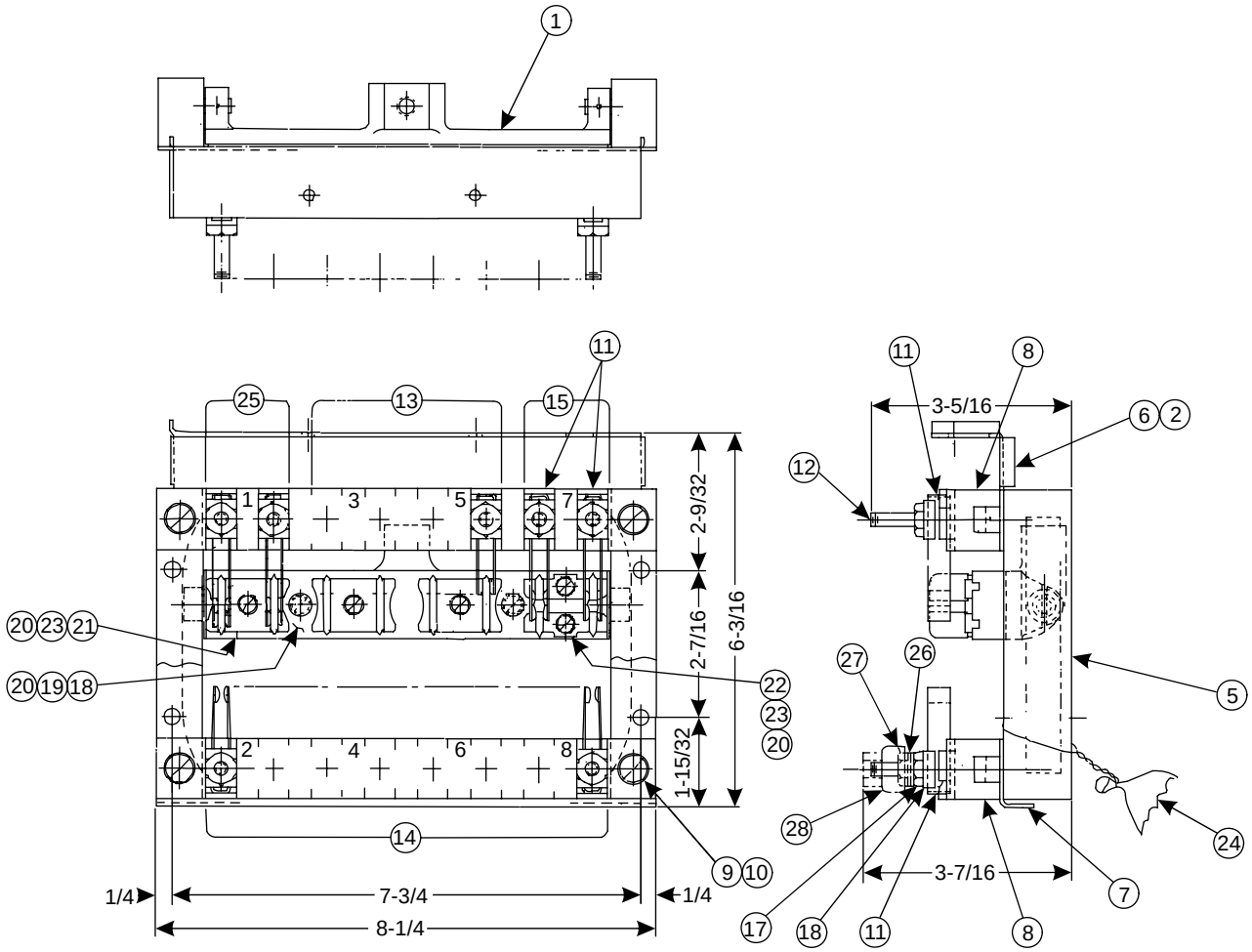
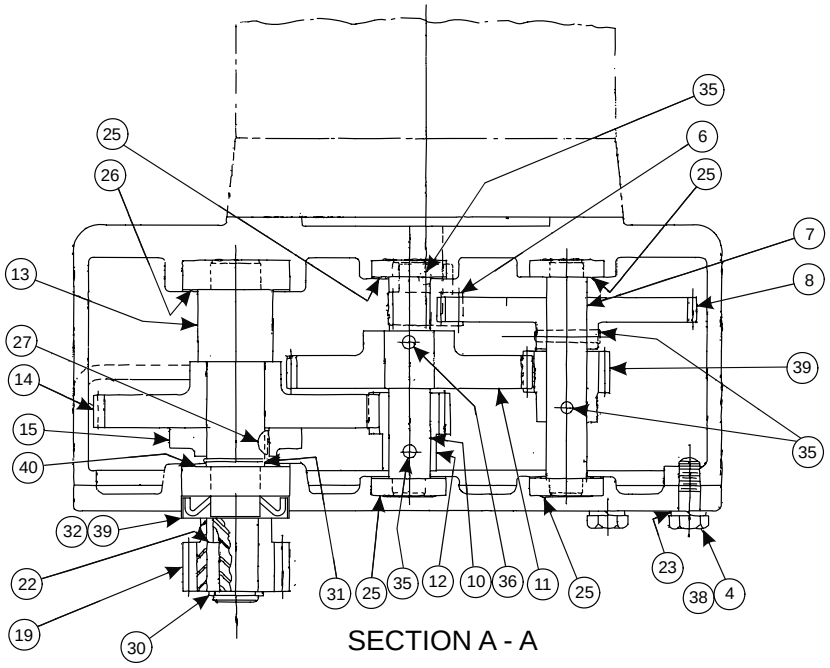


Figure 4-20. Parts Location for Circuit Controller N387657

Table 4-9 is the Parts List for EM-1 Train Stop PN387656 Gear Box. Figures associated with this table are Figure 4-21 and Figure 4-22.

Table 4-9. Gear Box for EM-1 Train Stop Parts List (PN387656)

Item Number	Description	Part Number
1	Housing, Gear	M387579
2	Gasket Compound, Loctite	J041249
3	Cover, Housing	M387580
4	Screw, Cover	M387834
5	Motor Assembly	N439068
6	Pinion, Motor Output	M387693
7	Clutch Shaft	M387691
8	Clutch Gear	M387698
9 (not shown)	Sealant, RTV Permatex	J041248
10	Shaft, 1” Dia. Steel	M387692
11	Gear, No. 3	M387696
12	Gear, No. 2	M387697
13	Shaft, Friction	M387690
14	Gear Assembly	N387766
15	Ratchet	M387695
16	Pawl, 3/8” x 2” Steel	M387709
17	Spring No. 25 x 1/4"	M387684
18	Washer	M387681
19	Pinion, 1-3/4” Steel Rod	M387700
20	Plug, 1/2" Dia. Steel	M388364
21	Washer	M013928
22	Keystock	M433801
23	Washer, 5/16” Pl, Lock Steel	J047526
24	Bolt, 3/8-16 x 1-1/4” Hex Hd	J463132
25	Bearing, Ball Radial	J066375
26	Bearing, Ball Radial	J066376
27	Key, 213 Woodruff 3/8” x 1/8”	J048780
28	Cotter Pin, 1/16” x 1/2" Spring Steel	J048603
29	W 21SST Bare M304-32	A043069
30	Ring, Waldes 5100 68	J792312
31	Ring, External Retaining	J790075
32	Klozure Garlick 63x145	J7919780
33	Plug, 1/8” Square Hd Steel	J032900
34	Adapter EM-1	N47611101
35	Pin, 3” x 1” Steel, TPR	J048861
36	Pin, 3” x 1-1/2” Steel, TPR	J048863
37	Name Plate	M437896001
38	Threadlocker – 242	J041245
39	Clutch Gear	M387699
40	Bearing, Sealed	J066034
41	Screw, 10-32 x 1/4" Rd Hd, SS	J525052
42	Tag, SLV 1/8” x 1/2"	J7928222008



SECTION A - A

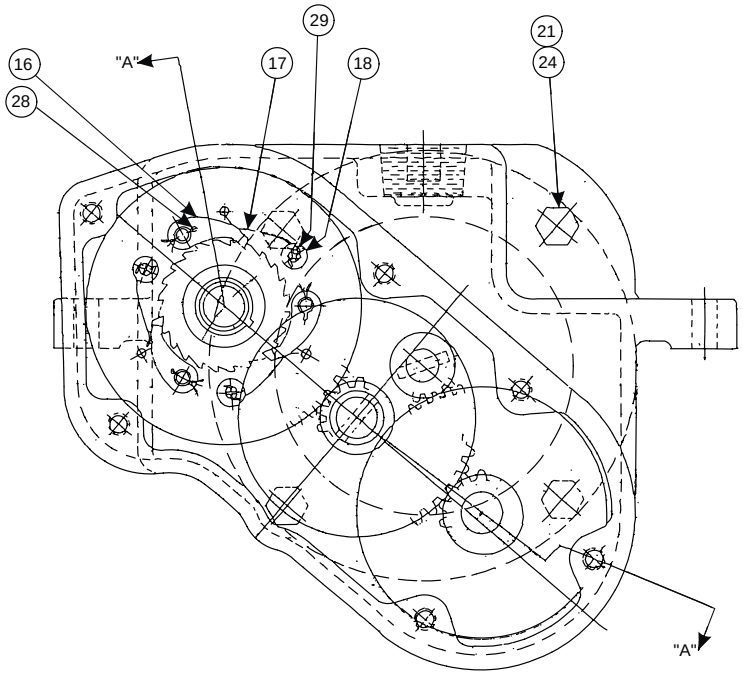


Figure 4-21. Gear Box - Parts Location

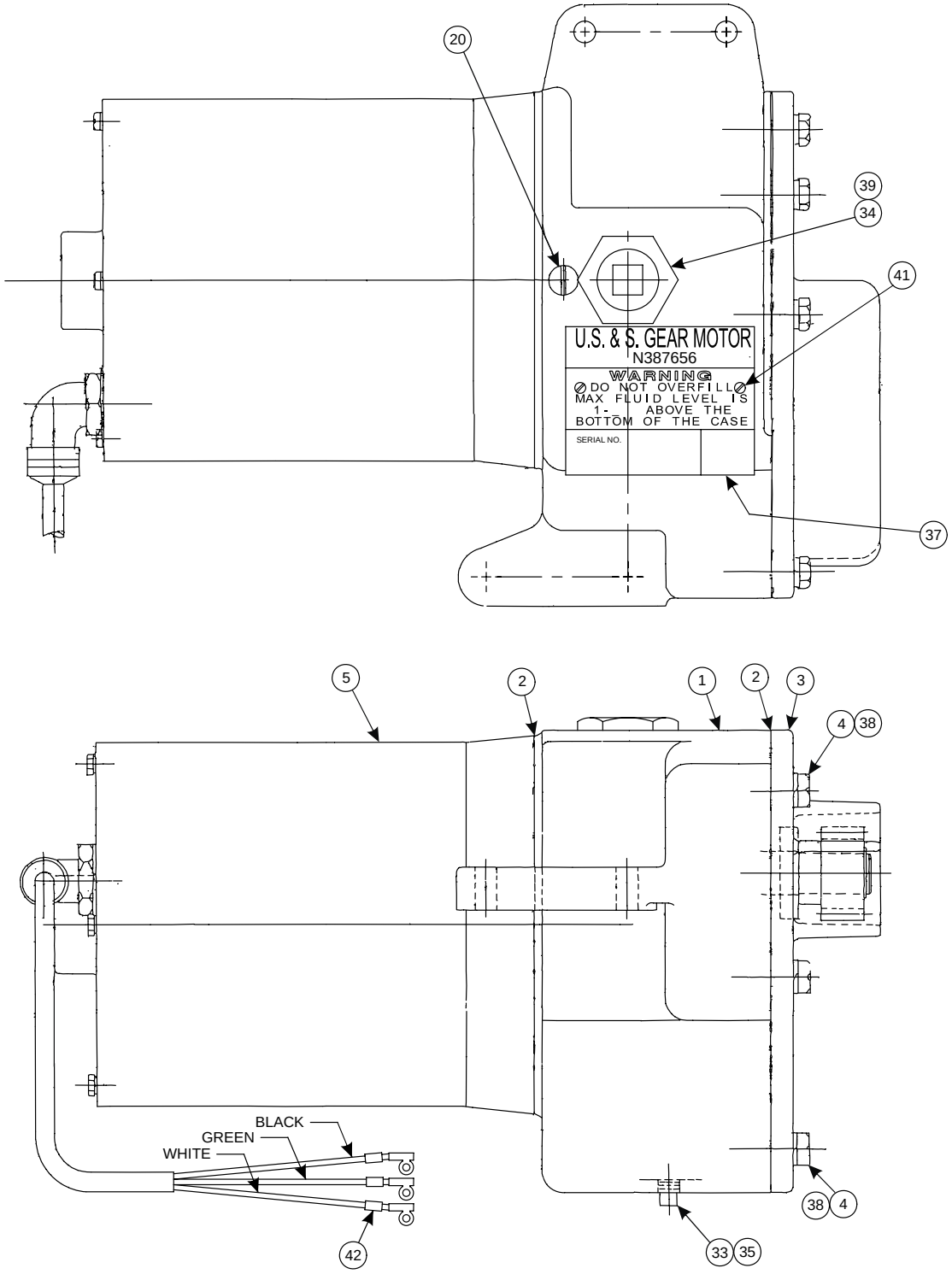


Figure 4-22. Gear Box Motor - Parts Location

5. TECHNICAL SUPPORT

The Rapid Action Information Link Team (RAIL Team) is a group of experienced product and application engineers ready to assist you to resolve any technical issues concerning this product. Contact the RAIL Team at 1-800-652-7276 or by e-mail at railteam@ansaldo-sts.us.

End of Manual